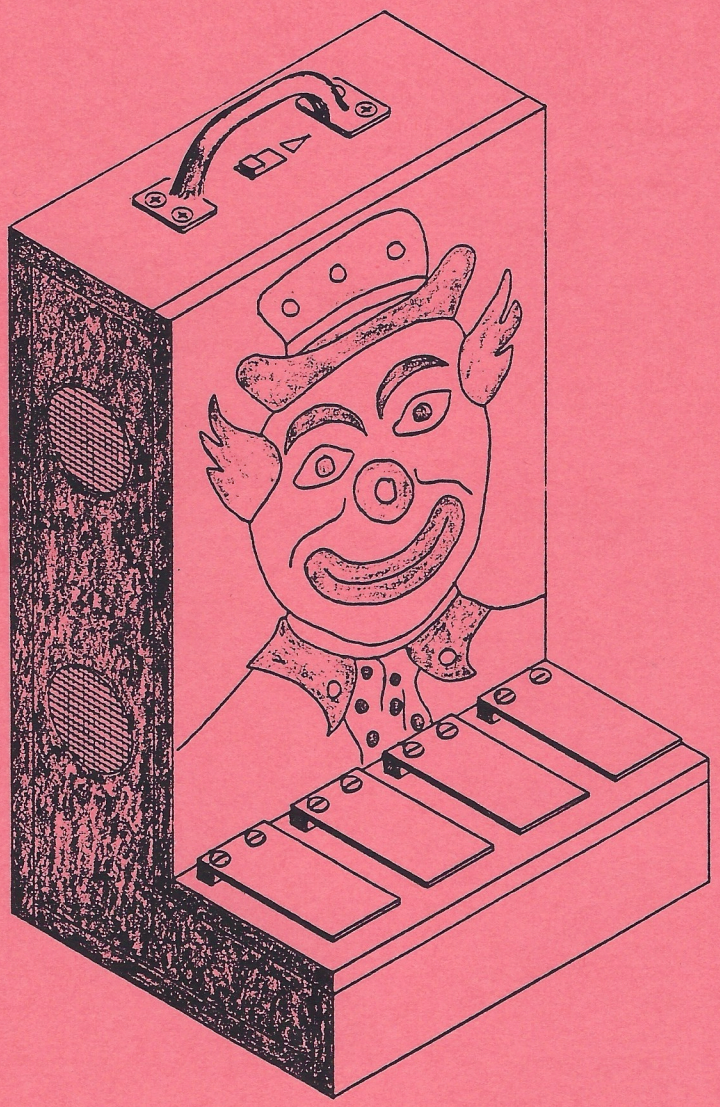
LEKOTEK PLAN BOOK of ADAPTIVE TOYS VOLUME II



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lekotek

ABOUT THE NATIONAL LEKOTEK CENTER

Lekotek is a system of support and information for families of children who have a disability or special need. In monthly play sessions specially trained Lekotek Leaders provide play modeling for families of children with disabilities and special needs. This enables the child to become more active in his family and the family more a part of the mainstream of society. Lekotek centers often offer other services to families in addition to the play sessions, including newsletters, educational workshops and social events, a mainstreaming program for preschoolers with disabilities or special needs, and the home loan of toys.

There are currently 54 Lekotek sites in 19 states, serving 3,500 families.

The National Lekotek Center is located in the Evanston Civic Center at 2100 Ridge Avenue, Evanston, Illinois, 60204.

INNOTEK is the technology division of the National Lekotek Center. It provides technology related resources and training to children with disabilities and special needs, their families, and the professionals who work with them throughout the United States.

INNOTEK provides multi-dimensional technology resources. These services include graduate level technology training courses and consultation services for school districts, therapy centers, parent groups, and recreation programs.

INNOTEK also oversees the network of Compuplay Resource Centers throughout the US. These centers offer computer play classes, drop-in centers, and software lending libraries to families with children with disabilities and special needs. Compuplay centers also provide in-service programs to teachers and therapists at the local level.

More information about the programs and services of Lekotek and INNOTEK can be obtained by calling the National Lekotek Center at (708) 328-0001.

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PLAN	NUMBER OF PAGES

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This toy plan book was produced through the efforts of Carl Gulbrandsen and William Grogg, Jr., both retired engineers who work with the National Lekotek Center. Special thanks to the many Lekotek Leaders who contributed their time and experience to make this book possible including the editors, Linda Schwartz, Raquel Reyes, and Rachel Reese. Layout and design were by Miriam S. Harris. The drafting was done by V. J. Jozaitis.

The mission of Lekotek is to assist in the integration of children with disabilities into the mainstream of society. This is done by helping families create a home atmosphere in which they can best nurture their children. Because children learn about their world through play, all Lekoteks have an extensive toy library for home loan.

It can be very difficult to find toys that truly meet the needs of children with severe physical or mental handicaps. Without certain tailored adaptations, many children could not experience the joy of playing with toys. It was for this reason Lekotek became interested in adapting toys for children with special needs.

This interest led to the first adapted toy plan book which was developed through a grant from The Quaker Oats Company. This book is one in a series of three which contain plans from Lekotek centers throughout the United States. Lekotek remains grateful for the continued support of The Quaker Oats Company in producing this series of books.

All the toys in this edition have been tested and used in Lekotek centers. Although the toys may have been developed to address the development of children who are physically or mentally limited in their abilities, it is the play value that is always the first consideration.

But, are the toys in this book only fun for children with special needs? Delightfully, no! It is through play that we can truly see that children are more alike than different. These toys will touch the joy in **all** children.

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As you read this book, keep in mind the importance of multi-sensory stimulation. Achieving a balance of visual, auditory and tactile stimulation for the child with disabilities is an important consideration. In creating toys from these plans keep in mind the following suggestions for sensory stimulation.

VISUAL

It is recommended that colors used to paint the toys be bright and clear shades of red, blue, green and yellow. While the use of bright colors and two-color patterns can actually reinforce learning, **excessive** use of bright colors or painted patterns on toys may be overstimulating. When painting a toy, care should be taken to keep color variety to a minimum. A neutral background for the basic toy with auxiliary parts painted in one or more of the basic primary colors, is recommended.

For many wooden toys, an application of a light coat of varnish is sufficient. This will provide a neutral background for any brightly colored parts. This coat of varnish will also aid in easy clean up.

AUDITORY

Some children may startle or become frightened by loud bursts of sound. It is recommended that toys which are auditorily stimulating contain tonal qualities which are soft and melodic. Loud buzzers are not generally recommended.

TACTILE

For toys which provide tactile stimulation, we recommend keeping each different component a markedly separate texture from the others. This serves to facilitate the child's ability to differentiate between them. In order that the tactile component of the toy be fully perceived by the child, it is recommended that the background consist of neutral or dark solid colors. When designing a toy remember that a child's hands are small and grip toys must be proportioned to their size.

PAINT SAFETY

In 1977, the U.S. Consumer Product Safety Commission published an act that regulates, in the public interest, the use of lead-containing paint. This act bans the use of lead-containing paint on toys and other articles intended for use by children. The act requires that lead-containing paints bear on their labels the statement, "Do not apply on toys and other children's articles, furniture, or interior surfaces which may be occupied or used by children." **When buying paint for children's toys or furniture, carefully read the label for the assurance that the paint does not contain lead.**

Some of the toys in the plan books have specific material lists that call for electrical or electronic components for assembly.

The source of some of these items has frequently been a surplus merchandise dealer who specializes in odd lots, overruns and/or obsolete items. Some are new; some are used. Usually they are priced well below the original cost of the item.

The problem that has surfaced is that a certain item, after a year or more, may no longer be available from the source used at the time of the publication of the plan book. Anyone using the plan book should consider the instructions as a guide and not as a specific direction in building a particular Lekotek toy. With similar components, any person with a capacity to build these toys should be able to use substitute components from other sources and adjust dimensions accordingly. The results should be an equally enjoyable toy.

Most toy makers find it as easy to make several of the same toy as to just make one. Cut enough pieces for multiple toys at the same time. But it is a good idea to then assemble one complete toy first so that any corrections in the cuts can be made before you proceed to assemble the rest of the toys. You will just be multiplying the fun for some very lucky children!

All of the toys in this book with flat bases will benefit from the application of non-skid material or rubber pads to the bases. This will help keep the toy within reach and stable for the child with developing coordination. A good material to use is the lightest weight carpet padding sold commercially to keep small area rugs from slipping around on the floor. Often, a friendly carpet dealer will provide a toy maker with left over scraps at minimal (or no) cost. These can be easily cut to fit the base of the toy.

Play has been defined as "positive active engagement" and as "pleasurable, enjoyable, and positively valued." If you go to the experts, however, children will define play in one word...fun. Until recently, the role of play in child development was not taken seriously or was even seen as an obstacle to learning.

The special characteristics of play are in its positive foundations and opportunities to interact with the environment, including the people and objects which surround a child. Play is also unique in that it is spontaneous and freely chosen.

Play has been shown to be related to other qualities, such as creativity, problem solving, language, and social/emotional development. Visual, auditory and tactile stimuli which automatically result from simple toy interactions act as reinforcers and maintain the toy play behavior (Murphy, et al., 1986).

For children with disabilities, conventional and commercial toys and commercial educational materials alone may not be appropriate. Physical, cognitive and sensory impairments may prevent the children from operating and learning from these materials (Hanline et al., 1985). Adapted toys can address this problem. A child needs to react and interact in the relaxed manner that is characteristic of play. Successful play can often be reliant on the reactions of the person who plays with the child. Helping the child achieve a feeling of success is vital to that child's development of a positive self concept. A child may only need to touch a toy or art project in order to feel directly responsible for the finished product (Lindquist, 1977).

Adapted toys create a situation in which the child can have control. This can be an imaginary setting or a practical life situation. The important factor is that the control rest with the child. Coker (1984) states that as interest has increased in the earlier intervention of infants and toddlers with disabilities, so has the need for the development of materials to meet the needs of this younger population.

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Lindquist, I. *Therapy Through Play*. London: Arlington Books, 1970.

Murphy, G., Carr, J., & Callias, M. "Increasing Simple Toy Play in Profoundly Mentally Handicapped Children: II. Designing Special Toys." *Journal of Autism and Developmental Disorders* 16 (1986), pp. 45-58.

VIDEOTAPES VHS only (V#'s for sales and R#'s for rental) Two-week rental requires a $25.00 deposit by separate check. Postage and handling charge: $3.50 for 1; $5.00 for 2; $8.00 for 3 or more.

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V200.....$50.00 R200.....1 for $15.00 and 2 for $25.00

PUBLICATIONS

LEKOTEK PLAY GUIDE FOR CHILDREN WITH SPECIAL NEEDS A discussion of toys and play for the parents of children who have disabilities. Postage and handling by weight and distance. P450.....$3.75 each

VOLUMES I, II and III of the LEKOTEK PLAN BOOK OF ADAPTIVE TOYS Detailed plans and drawings for making switches, toy adaptations & wooden toys for children, especially those with handicaps. P600, P650 and P675

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INNOTEK SOFTWARE RESOURCE GUIDE 1990 A guide for the selection of computer software and hardware appropriate for children with special needs, ages 2 -14 yrs.
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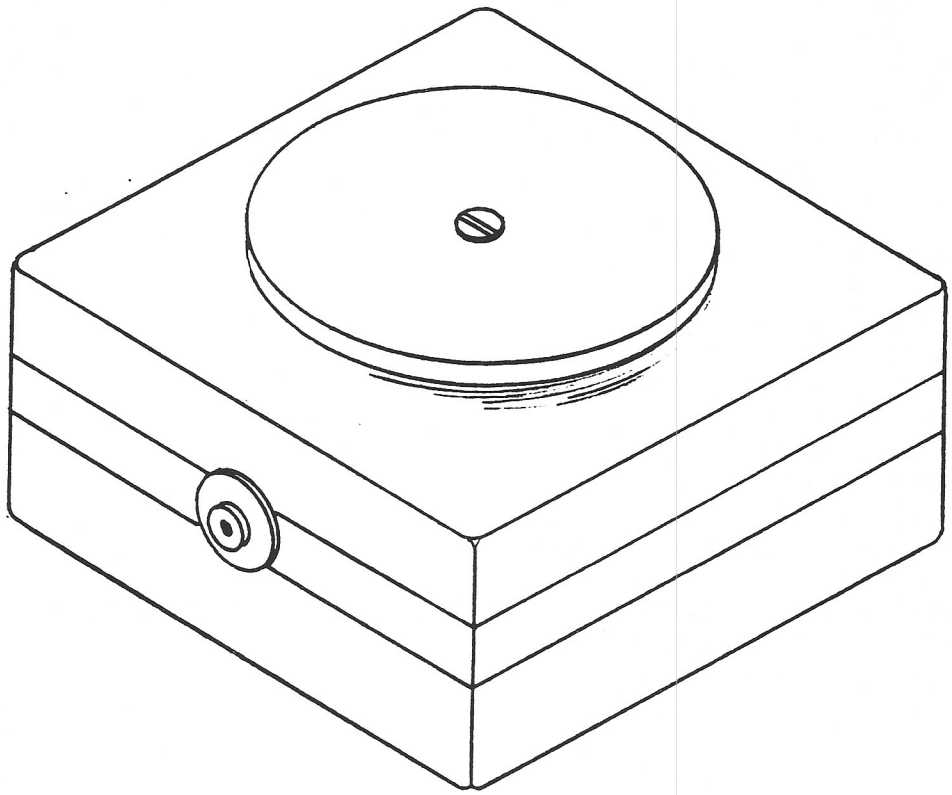
ROUND SWITCH

There is always a need for a rugged, smaller switch that requires the very lightest touch to make it operate. Like other Lekotek switches (see the first volume of the Lekotek Plan Book of Adaptive Toys), this one is used with a connecting cord that has a plug on each end. One plug goes in the switch jack and the other goes in the toy jack.



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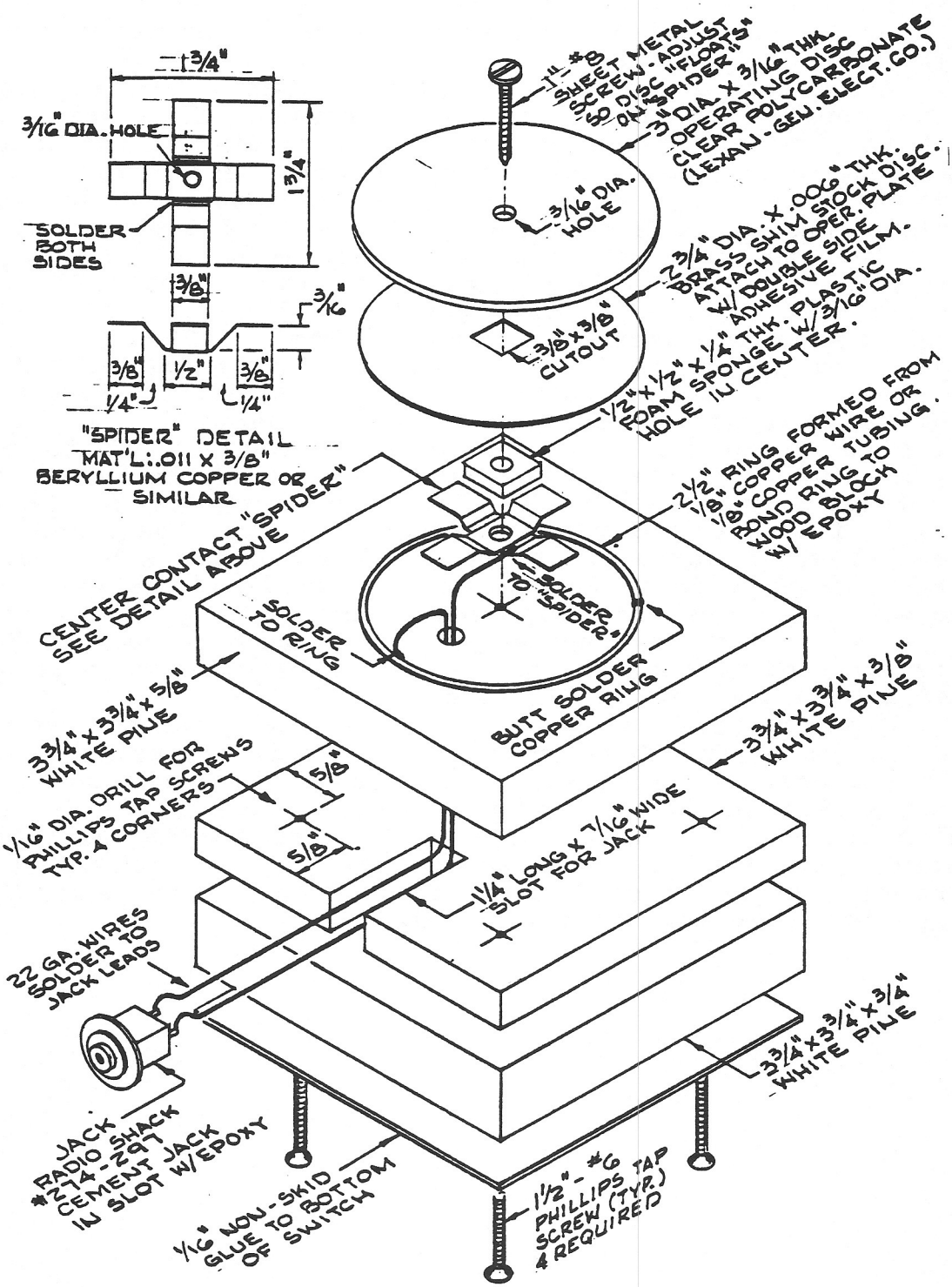
Materials needed:

- Two white pine 3 3/4" x 3 3/4" x 5/8"
- One white pine 3 3/4" x 3 3/4" x 3/8"
- Four flat head Phillips tapping screws 1 1/2" x #6
- One sheet metal screw, pan head 1 1/2" x #8
- Brass shim stock .003" x .006"
- Lexan disc cut from 3/16" Lexan or Polycarbonate
- One piece 1/8" copper tube or copper wire, 10" long
- Two pieces Beryllium copper 2 1/4" x 3/8" x .010"
- One piece 22 guage stranded copper wire
- Jack, Radio Shack #274-297
- One 1/4" plate washer
- One 3/16" plate washer
- One piece non-skid material for bottom
- Contact cement for non-skid material
- Epoxy glue
- Rosin core solder
- One piece 1/2" x 1/2" x 1/4" thick plastic foam sponge
- Small tacks or escutcheon pins
- Paint for underside of disc
- Brightly colored paint for body of switch

Tools needed:

- Table saw
- Sandpaper
- Metal cutting shears
- Drill and bits
- Fine tooth hacksaw or tubing cutter
- Small soldering iron
- Wire cutters
- Knife or wire stripper
- Hammer
- Phillips screwdriver and flat blade screwdriver
- Ruler, straight edge
- Paintbrush


1 3/4"
3/16" DIA. HOLE
1 3/4"
SOLDER BOTH SIDES
3/8"
3/16"
3/8"
1/2"
3/8"
1/4"
1/4"
"SPIDER" DETAIL
MAT'L: .011 X 3/8"
BERYLLIUM COPPER OR SIMILAR
1" #8 SHEET METAL SCREW - ADJUST SO DISC "FLOATS" ON "SPIDER"
3" DIA. X 3/16" THK. OPERATING DISC CLEAR POLYCARBONATE (LEXAN - GEN. ELECT. CO.)
3/16" DIA. HOLE
2 3/4" DIA. X .006" THK. BRASS SHIM STOCK DISC. ATTACH TO OPER. PLATE W/ DOUBLE SIDE ADHESIVE FILM.
3/8" X 3/8" CUTOUT
1/2" X 1/2" X 1/4" THK. FOAM SPONGE W/ 3/16" DIA. HOLE IN CENTER. PLASTIC
2 1/2" RING FORMED FROM 1/8" COPPER WIRE OR 1/8" COPPER TUBING. BOND RING TO WOOD BLOCK W/ EPOXY
CENTER CONTACT "SPIDER" SEE DETAIL ABOVE
SOLDER TO "SPIDER"
SOLDER TO RING
BUTT SOLDER COPPER RING
3 3/4" X 3 3/4" X 5/8" WHITE PINE
3 3/4" X 3 3/4" X 3/8" WHITE PINE
1/16" DIA. DRILL FOR PHILLIPS TAP SCREWS TYP. 4 CORNERS
5/8"
5/8"
1 1/4" LONG X 7/16" WIDE SLOT FOR JACK
22 GA. WIRES SOLDER TO JACK LEADS
JACK RADIO SHACK #274-297 CEMENT JACK IN SLOT W/ EPOXY
1/16" NON-SKID GLUE TO BOTTOM OF SWITCH
3 3/4" X 3 3/4" X 3/4" WHITE PINE
1 1/2" - #6 PHILLIPS TAP SCREW (TYP.) 4 REQUIRED

Construction suggestions:

The operating plate is a disc of clear or colored plastic, preferably Lexan or polycarbonate, as it is durable and easy to work with. If clear plastic is used, paint the underside of the disc a bright color. Bond a disc of brass shim stock, .006" or thinner, and somewhat smaller diameter to the painted surface with double adhesive film.

The switch action is accomplished when the disc, supported by the "spider" in the center, is depressed. This makes contact with the "spider," the disc and the copper ring on the base. The center hole in the "spider" and the brass shim disc must have center holes large enough to clear the support screw. The "spider" must be made of material that has a bit of spring to it.

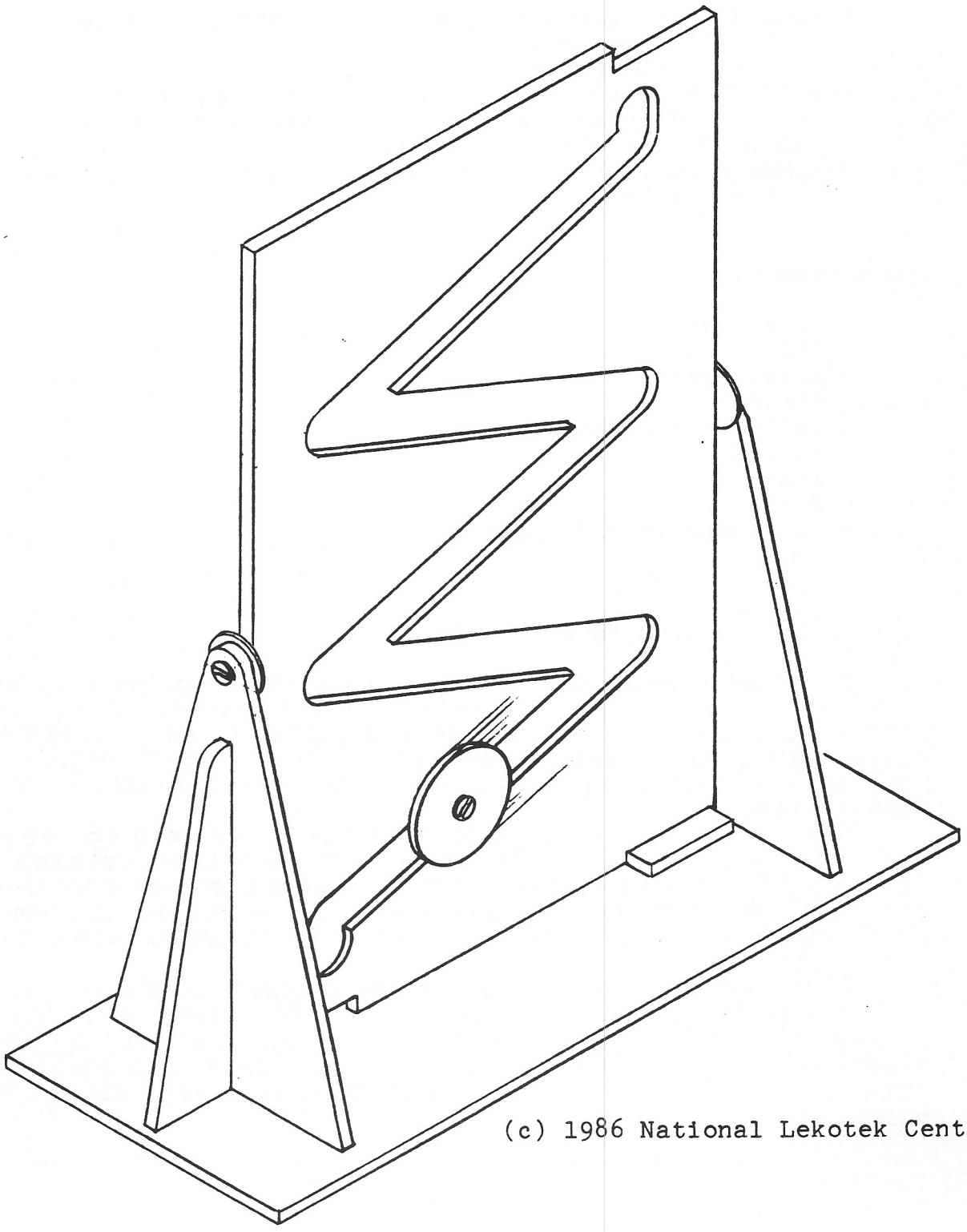
The base construction as shown may be revised by using only the upper and lower wood pieces, if tools are available to slot the top piece to accommodate the jack. Shorter screws (1") can then be used to assemble the unit. The 2 1/2" copper ring of wire or tubing can be formed around a suitable cylindrical object and then cut to form a butt-end solder connection. Make sure the ring is flat after soldering. The connecting wire is to be soldered on to the ring opposite the butt joint to prevent disturbing that joint. To bond the ring to the block, form a circle of epoxy glue on the block and gently place the copper ring in it. Press in place, centered on the block, and place a sheet of wax paper over the ring. Place weights on the paper, large enough to cover completely and wait for the epoxy to set. The wax paper prevents any epoxy from bonding to the weights. For weights, two or three heavy bricks should be sufficient. The wire attached to the ring should be run through the hole and out the slot before bonding the ring.

When the ring is bonded in place, the block can be painted the desired color. Mask the ring and spider for painting.

The wire from the spider is also run through the hole and out the slot to be attached to the jack. The jack, as shown in the drawing, has a 1/4" plate washer and a 3/16" plate washer attached to provide a flat surface to the block and additional support. After soldering the two wires to the jack, a small amount of epoxy will hold it in place.

ZIG ZAG TRACKER

A colorful disk travels down the zigzag path on this upright tracker. When the disk reaches the bottom of the track, a simple push causes the board to rotate, ready to begin again.



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Materials needed:

- From 3/8" thick plywood, cut the following:
  - 1 - 14" x 21 3/8"
  - 2 - 7" x 11 1/2"
  - 2 - 2 3/8" x 9"
  - 1 - 8" x 20 1/4"
  - 2 - 2 1/2" x 5/8"
- From 1/8" or thinner plywood or tempered Masonite:
  - 2 - 3" diameter
  - 2 - 1 3/8" diameter
- From 1" diameter dowel, cut one 5/8" long piece
- Two 1" x #6 flat head regular slotted wood screws
- Two 3/8" x #4 sheet metal screws
- Elmer's Carpenter's Wood Glue or equal
- 1" x #18 wire brads

Tools needed:

- Saber saw
- Table saw
- Drill press
- Sander
- Set of drill bits
- Hammer
- Ruler
- Square
- Varathane varnish (gloss) or equal
- Brush

Construction suggestions:

Draw the layout for the track, as detailed on page 4, onto a 21 3/8" x 14" piece of 3/8" thick birch plywood. Cut the 3" x 1/2" notches at top right and bottom left. At each of the eight center points developed in the layout, drill a 5/8" hole. Drill part way through from each side to assure a smooth cut on each plywood face.

Use a saber saw with 16 or more teeth per inch to cut along the line that makes up the track. Rather than attempt this freehand, it is best to make a guide from a strip of wood that is one-half the width of the base plate of the saber saw. Use this as a spacer to locate and clamp another strip parallel to the line to be cut.

With all cuts made, sand all track edges carefully.

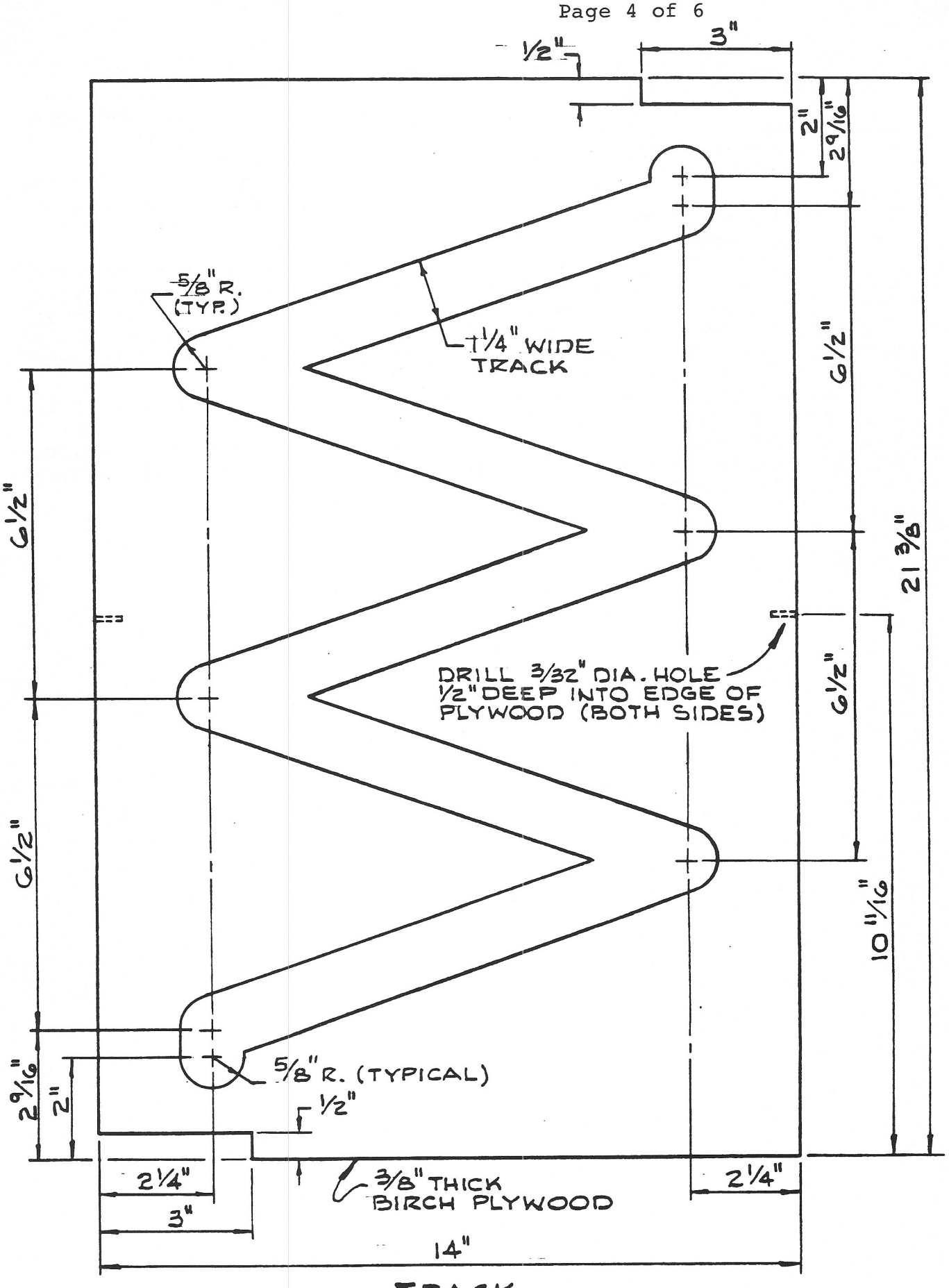
On the track board, divide the 21 3/8" dimension in half and make a mark at this point on both side edges. Carefully drill a 3/32" diameter hole about a half inch deep into each edge at each mark. The track board will pivot on the screws that go into these holes.

Cut out and sand all pieces shown on page 5: two discs and one roller for the track wheel assembly, two spacers, two upright track rollers, and two upright braces. Cut out and sand the two stops detailed in the top view on page 6 and the 20 1/4" x 8" track stand shown in the bottom view on page 6.

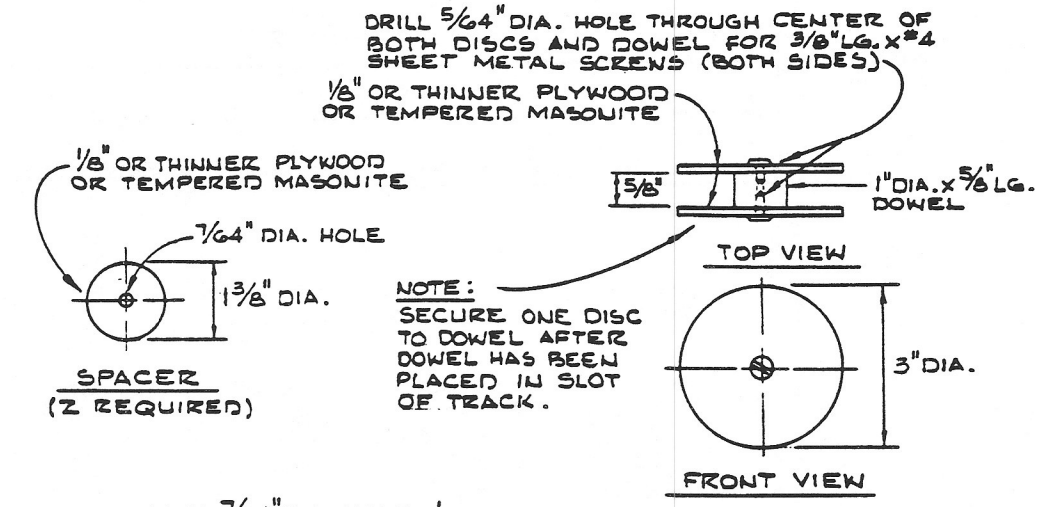
As described on page 6, assemble all the track stand pieces and the 21 3/8" x 14" cut out track, using glue and brads. Varnish the completed assembly with two coats of Varathan Gloss Varnish, or equal, sanding lightly between coats.

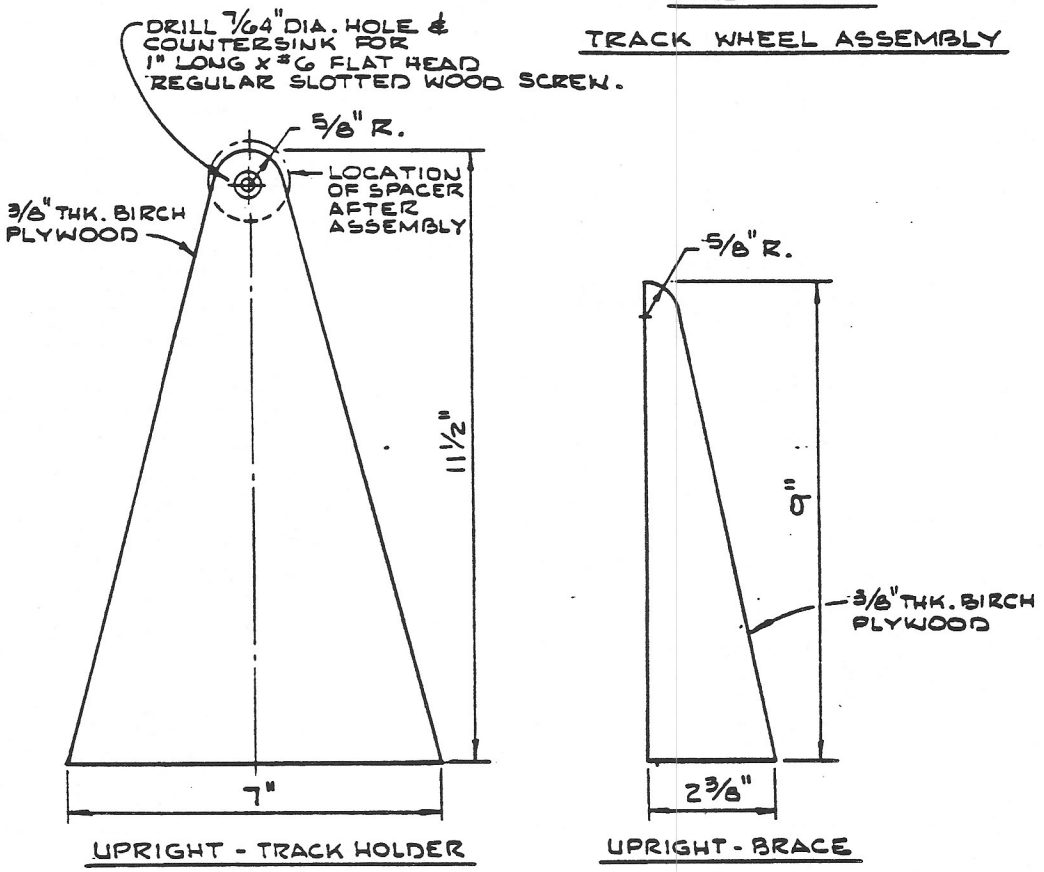
We have found that the track wheel assembly scoots down the track with a rotating and sliding motion. If a rotating motion only is desired, take the track wheel assembly apart and spray the 1" diameter x 5/16" long center dowel with the latex spray used to keep throw rugs from slipping on a bare floor ("Sta-Put" by Cling Surface Co, Inc.).

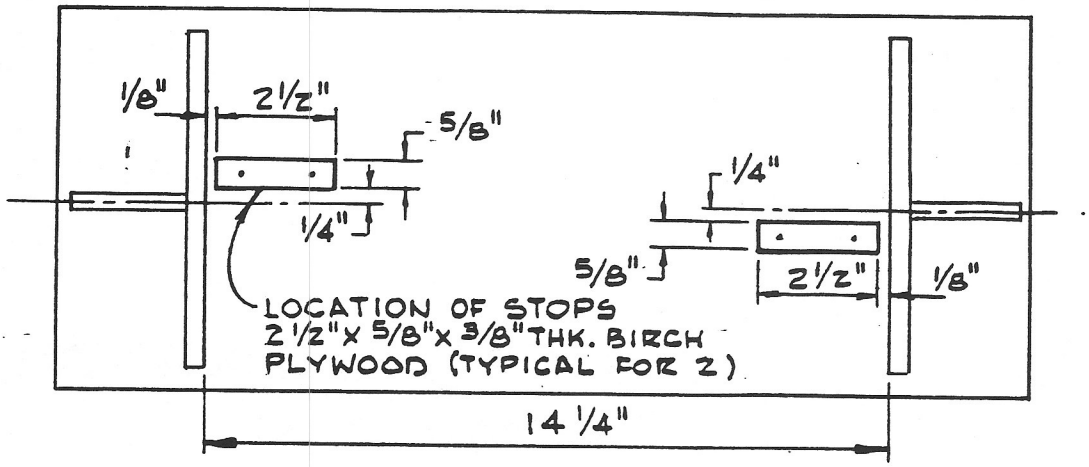
Assemble the track wheel within the track and allow it to roll down to the bottom. Then rotate the whole board until it touches the stop. The wheel will roll down the track again. Bright colors painted onto the sides of the track wheel may heighten interest.


1/2"
3"
2"
2 9/16"
5/8" R. (TYP.)
1 1/4" WIDE TRACK
6 1/2"
6 1/2"
21 3/8"
DRILL 3/32" DIA. HOLE 1/2" DEEP INTO EDGE OF PLYWOOD (BOTH SIDES)
6 1/2"
6 1/2"
10 11/16"
2 9/16"
2"
5/8" R. (TYPICAL)
1/2"
2 1/4"
3"
3/8" THICK BIRCH PLYWOOD
2 1/4"
14"

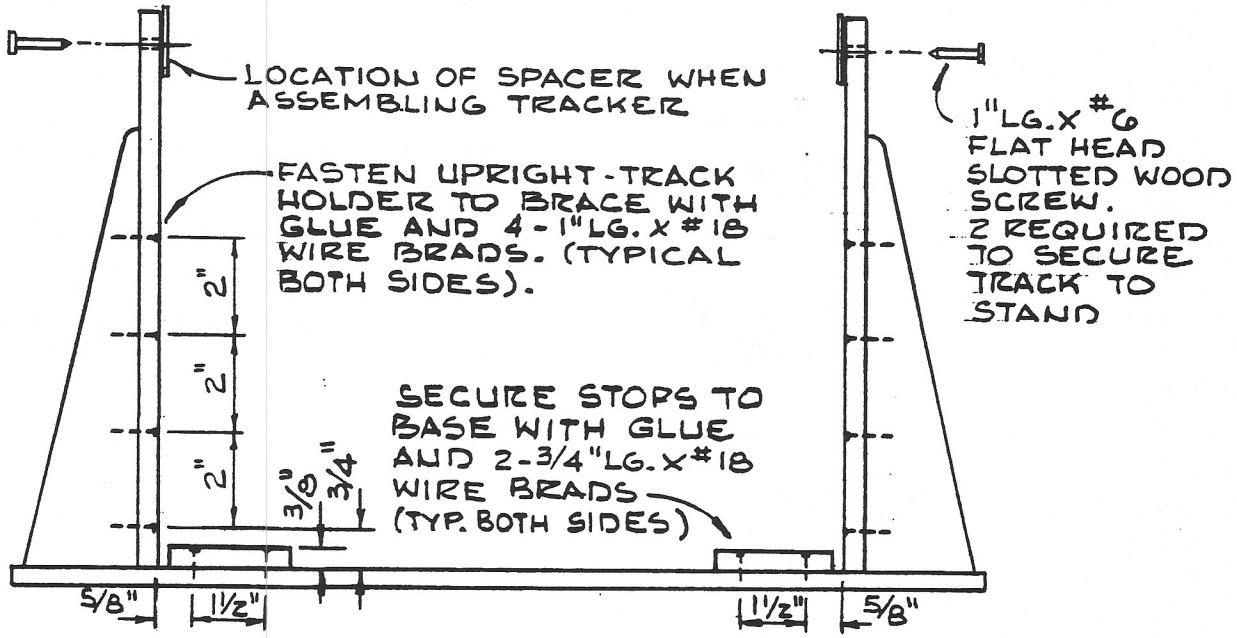
TRACK


DRILL 5/64" DIA. HOLE THROUGH CENTER OF BOTH DISCS AND DOWEL FOR 3/8" LG. x #4 SHEET METAL SCREWS (BOTH SIDES)
1/8" OR THINNER PLYWOOD OR TEMPERED MASONITE
1/8" OR THINNER PLYWOOD OR TEMPERED MASONITE
7/64" DIA. HOLE
1 3/8" DIA.
SPACER
(2 REQUIRED)
NOTE:
SECURE ONE DISC TO DOWEL AFTER DOWEL HAS BEEN PLACED IN SLOT OF TRACK.
5/8"
1" DIA. x 5/8" LG. DOWEL
TOP VIEW
3" DIA.
FRONT VIEW
TRACK WHEEL ASSEMBLY

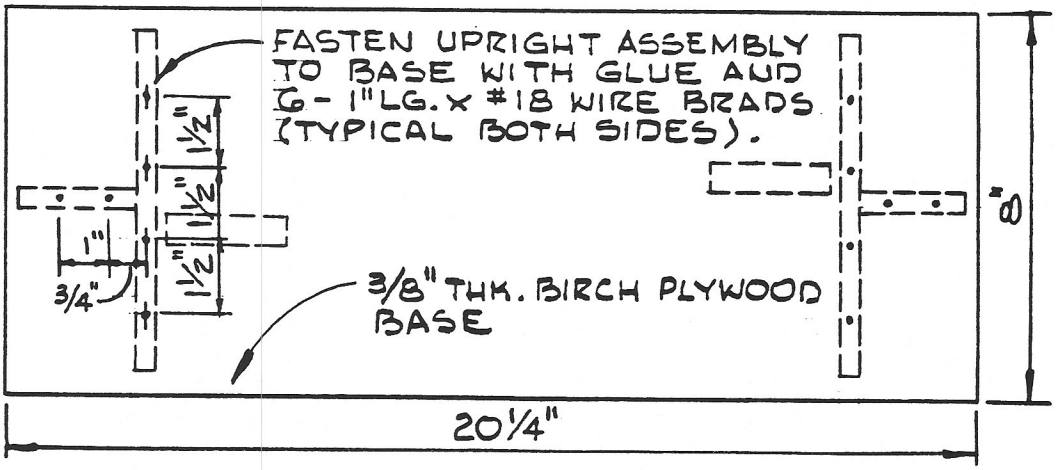

DRILL 7/64" DIA. HOLE & COUNTERSINK FOR 1" LONG x #6 FLAT HEAD REGULAR SLOTTED WOOD SCREW.
5/8" R.
LOCATION OF SPACER AFTER ASSEMBLY
3/8" THK. BIRCH PLYWOOD
11 1/2"
7"
UPRIGHT - TRACK HOLDER
5/8" R.
9"
3/8" THK. BIRCH PLYWOOD
2 3/8"
UPRIGHT - BRACE



TOP VIEW OF TRACK STAND ASSEMBLY


LOCATION OF SPACER WHEN ASSEMBLING TRACKER
1" LG. X #6 FLAT HEAD SLOTTED WOOD SCREW. 2 REQUIRED TO SECURE TRACK TO STAND
FASTEN UPRIGHT-TRACK HOLDER TO BRACE WITH GLUE AND 4-1" LG. X #18 WIRE BRADS. (TYPICAL BOTH SIDES).
2"
2"
2"
SECURE STOPS TO BASE WITH GLUE AND 2-3/4" LG. X #18 WIRE BRADS (TYP. BOTH SIDES)
3/8"
3/4"
5/8"
1 1/2"
1 1/2"
5/8"

FRONT VIEW OF TRACK STAND ASSEMBLY



BOTTOM VIEW OF TRACK STAND ASSEMBLY

VIBRATING PILLOWS

These vibrating pillows are gentle, interesting and stimulate curiosity. There are many ways they can be used and, when adapted as shown, the vibrating action is controlled by the child. Pillow A is tubular and is activated by a switch on the end. Pillow B is flat and has straps to attach to the child.

Materials needed for Pillow A:

- A vibrating pillow, 5" diameter x 12" long with built in switch on one end. Obtain from a hospital or medical supply store or from Hyman Products Company, Inc., PO Box 1592, Maryland Heights, MO 63043. Telephone (314) 991-4241.
- Adaptive switch from Lekotek Plan Book of Adaptive Toys
- Connecting cord with a plug at each end from Lekotek Plan Book of Adaptive Toys
- Radio Shack jack #274-251
- 18 gauge stranded wire
- Solder
- 1/16" thick x 1 1/2" x 1" Lexan (polycarbonate) plate
- 1/2" O.D. x 1/2" long Lexan tubing
- Plastic cement or Superglue
- Two small pop rivets

Tools needed for Pillow A:

- Drill, size of Radio Shack jack #274-251
- Wire cutters
- Soldering iron
- Pop riveting tool

Construction suggestions for Pillow A:

Unzip the pillow and carefully remove the vibrator mechanism, noting how it was located in the foam. Make up a jack assembly as shown on the drawings on page 2 with wires soldered to the jack terminal. Cut or drill two rivet holes and the jack hole in the end of the pillowcase. Cement the short length of Lexan tubing to the plate as shown in the drawing on page 2. Assemble the plate and jack as shown and pop rivet to the pillowcase end. Reassemble the vibrator into the foam and reinsert into the pillowcase. Using a Lekotek connecting cord with a plug on each end, plug into the pillow and into any of the Lekotek switches that the child has been taught to operate. When replacing batteries, remove and replace the plastic sleeve around the batteries.

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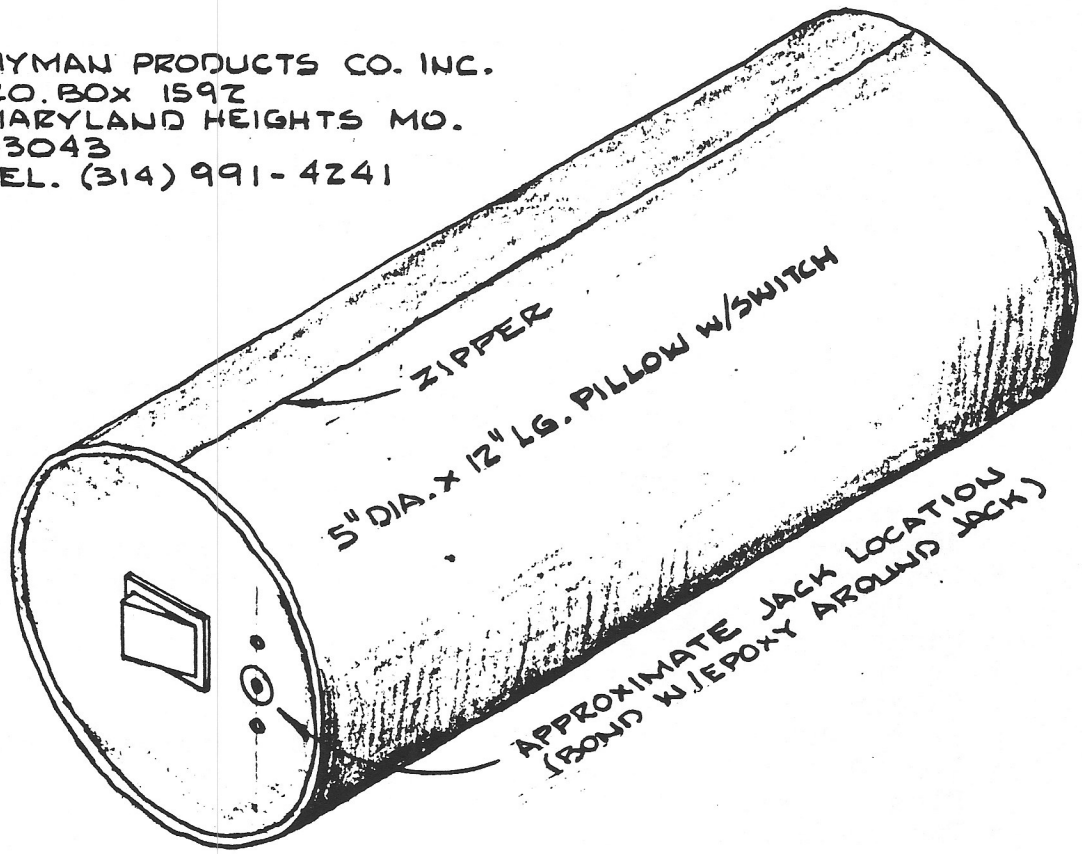
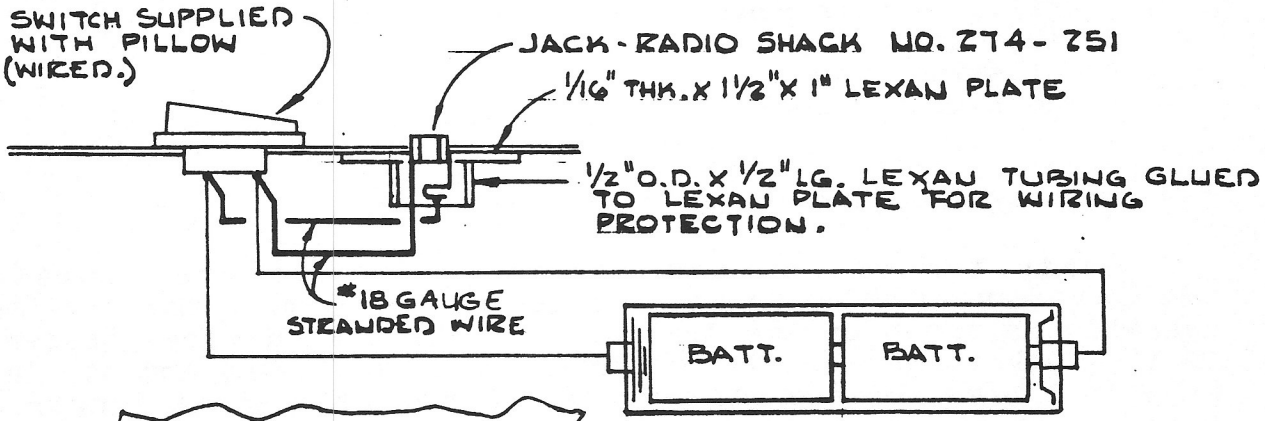
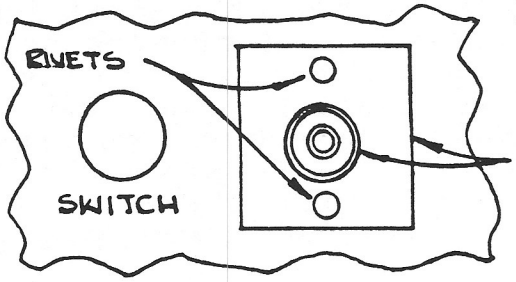
HYMAN PRODUCTS CO. INC.
P.O. BOX 1592
MARYLAND HEIGHTS MO.
63043
TEL. (314) 991-4241



VIBRATING PILLOW A


SWITCH SUPPLIED WITH PILLOW (WIRED.)
JACK - RADIO SHACK NO. 274-251
1/16" THK. x 1 1/2" x 1" LEXAN PLATE
1/2" O.D. x 1/2" LG. LEXAN TUBING GLUED TO LEXAN PLATE FOR WIRING PROTECTION.
#18 GAUGE STEANDED WIRE
BATT.
BATT.

JACK WIRING DIAGRAM



LEXAN PLATE & TUBING SECURED WITH RIVETS TO PILLOW CASE.

INSTALLATION VIEW FROM INSIDE OF PILLOW CASE

NOTE:
WIRING SHOWN IN HEAVY LINES IS NEW.
ALL CONNECTIONS ARE SOLDERED

Materials needed for Pillow B:

- A vibrating pillow, 11" square. See "Materials needed for Pillow A" for address
- Adaptive switch from Lekotek Plan Book of Adaptive Toys
- Connecting cord with plug at each end from Lekotek Plan Book of Adaptive Toys
- Radio Shack jack #274-251
- 18 gauge stranded wire
- Solder
- 1 3/4" x 1 3/4" piece of needlepoint plastic (craft store)
- 1/16" thick x 1 1/4" diameter Lexan disc
- Two pieces 1" wide x 14" long nylon web belting
- Two pieces 1" wide x 10" long nylon web belting
- Two pieces 1" wide x 4" long Velcro
- Plastic cement or Superglue
- Thread

Tools needed for Pillow B:

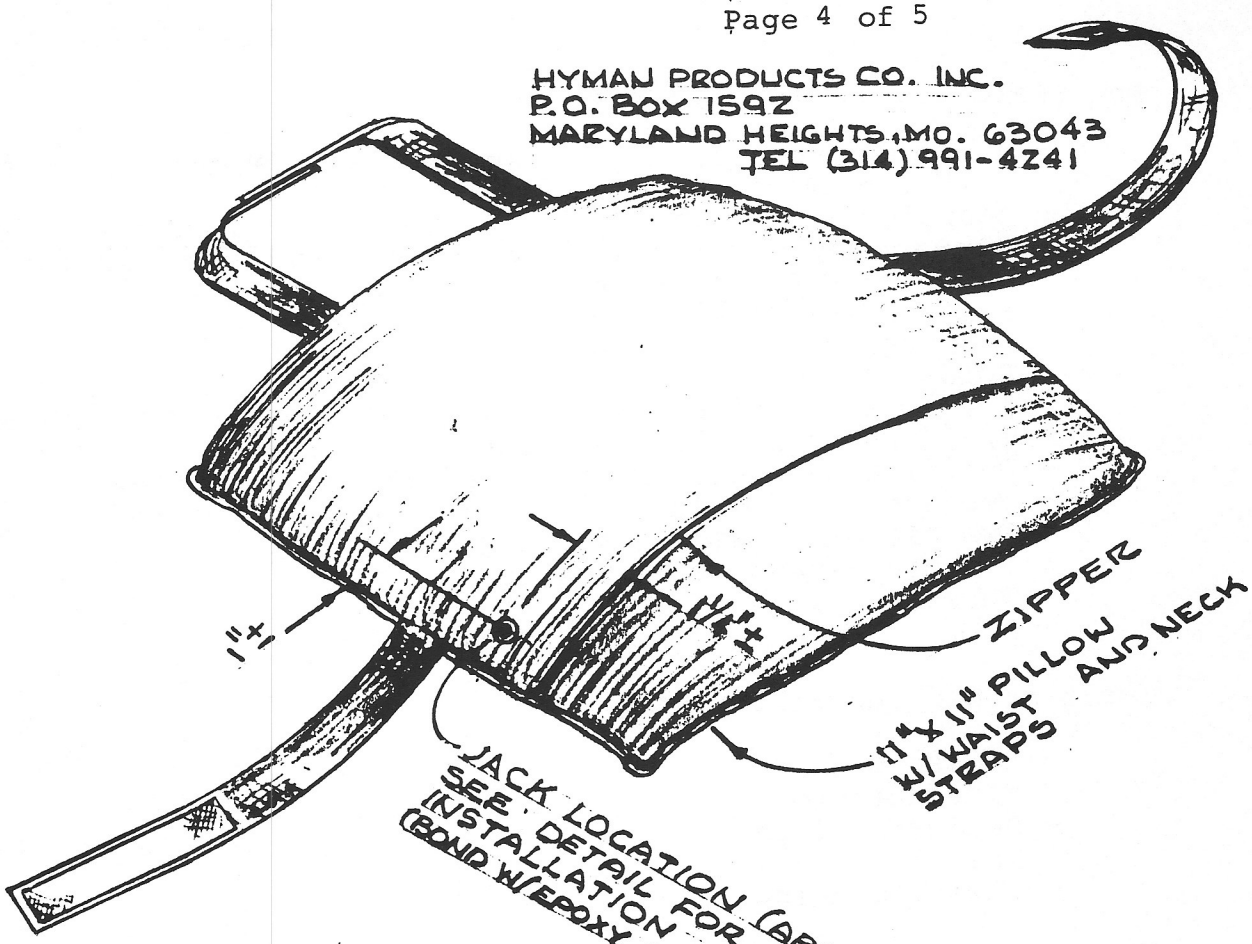
- Scissors
- Wire cutters
- Soldering iron
- Needle
- Sewing machine

Construction suggestions for Pillow B:

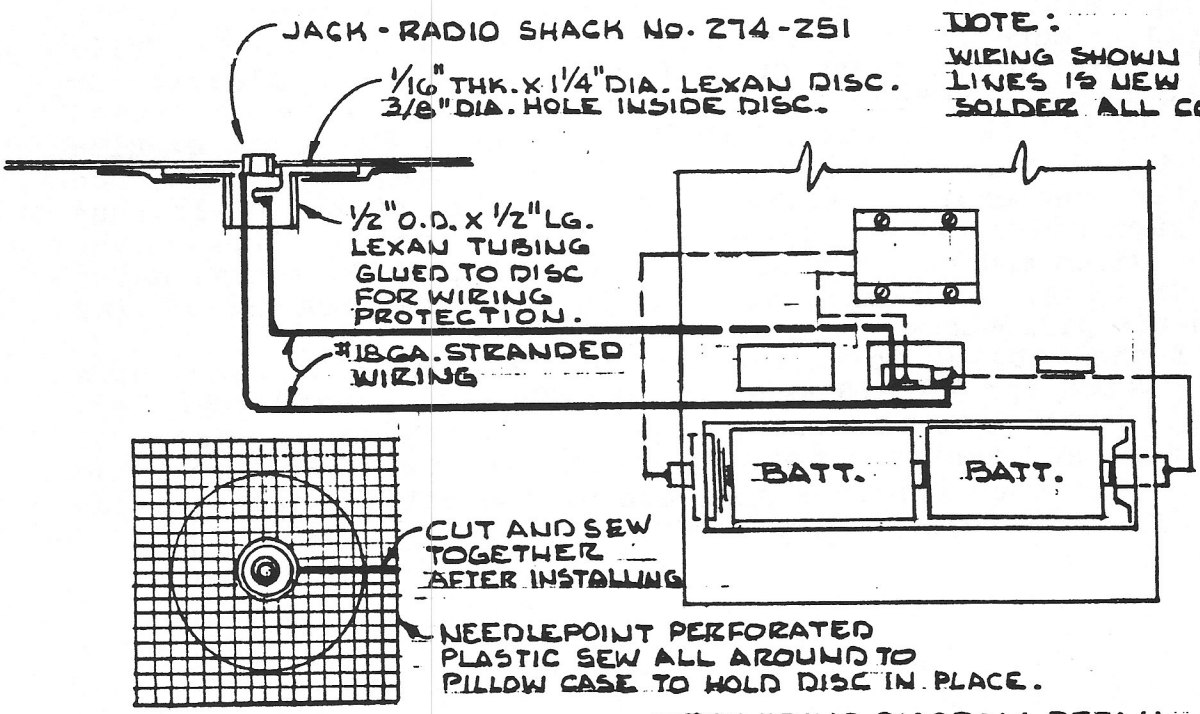
Open the zipper on the pillow and carefully remove the inner foam shape with the vibrator, noting how it was assembled in the pillowcase. Make up the jack assembly as shown on page 4. Drill or cut a hole in the piece of perforated needlepoint plastic for the jack to poke through. Locate where the jack is to extend through the pillow and cut a hole for the jack. Put a bit of glue around the inside of the hole to limit ravelling. Sew the perforated needlepoint plastic onto the inside of the pillowcase so the jack holes match. Solder the jack assembly wires to the vibrator wires and to the tabs under the original switch as shown in the drawing. Carefully reassemble with the jack protruding through the pillowcase.

Cut the webbing to the proper length. Hold each end over a lighted match for 5 to 10 seconds to melt the threads together. This will eliminate ravelling. Sew the 4" pieces of Velcro to the webbing and then the webbing to the pillow as shown in the drawing. One set of straps goes around the child's neck and the other around the child's upper body.

HYMAN PRODUCTS CO. INC.
P.O. BOX 1592
MARYLAND HEIGHTS, MO. 63043
TEL (314) 991-4241



VIBRATING PILLOW B


JACK - RADIO SHACK No. 274-251
1/16" THK. X 1 1/4" DIA. LEXAN DISC.
3/8" DIA. HOLE INSIDE DISC.
1/2" O.D. X 1/2" LG. LEXAN TUBING GLUED TO DISC FOR WIRING PROTECTION.
#18GA. STRANDED WIRING
BATT.
BATT.
CUT AND SEW TOGETHER AFTER INSTALLING
NEEDLEPOINT PERFORATED PLASTIC SEW ALL AROUND TO PILLOW CASE TO HOLD DISC IN PLACE.

NOTE:
WIRING SHOWN IN HEAVY LINES IS NEW
SOLDER ALL CONNECTIONS

INSTALL. VIEW FROM INSIDE OF PILLOW CASE

JACK WIRING DIAGRAM DETAIL

Use a Lekotek connecting cord with a plug on each end to plug into the pillow jack and into the jack of one of the smaller Lekotek switches. The child can operate the pillow by closing the switch. Usually the child is delighted to find that the pillow will turn itself on without using the switch (when she's wearing it) if she hugs herself against someone. When replacing batteries, also remove and replace the plastic sleeve around the batteries.

TURN N LEARN ACTIVITY CENTER COVER

The usefulness of the Fisher-Price Turn N Learn Activity Center can be extended by adding this textured cover. The cover is made of four machine washable fabrics: plush, satin, terrycloth, and seersucker. It fits snugly onto the Turn N Learn and is particularly interesting to babies who are visually impaired.

Materials needed:

- A Fisher-Price Turn N Learn Activity Center
- Four pieces of machine washable cloth of differing textures such as velvet, satin, terrycloth and seersucker
- Two large jingle bells (3/4" diameter)
- Sewing thread

Tools needed:

- Scissors
- Pins
- Sewing machine

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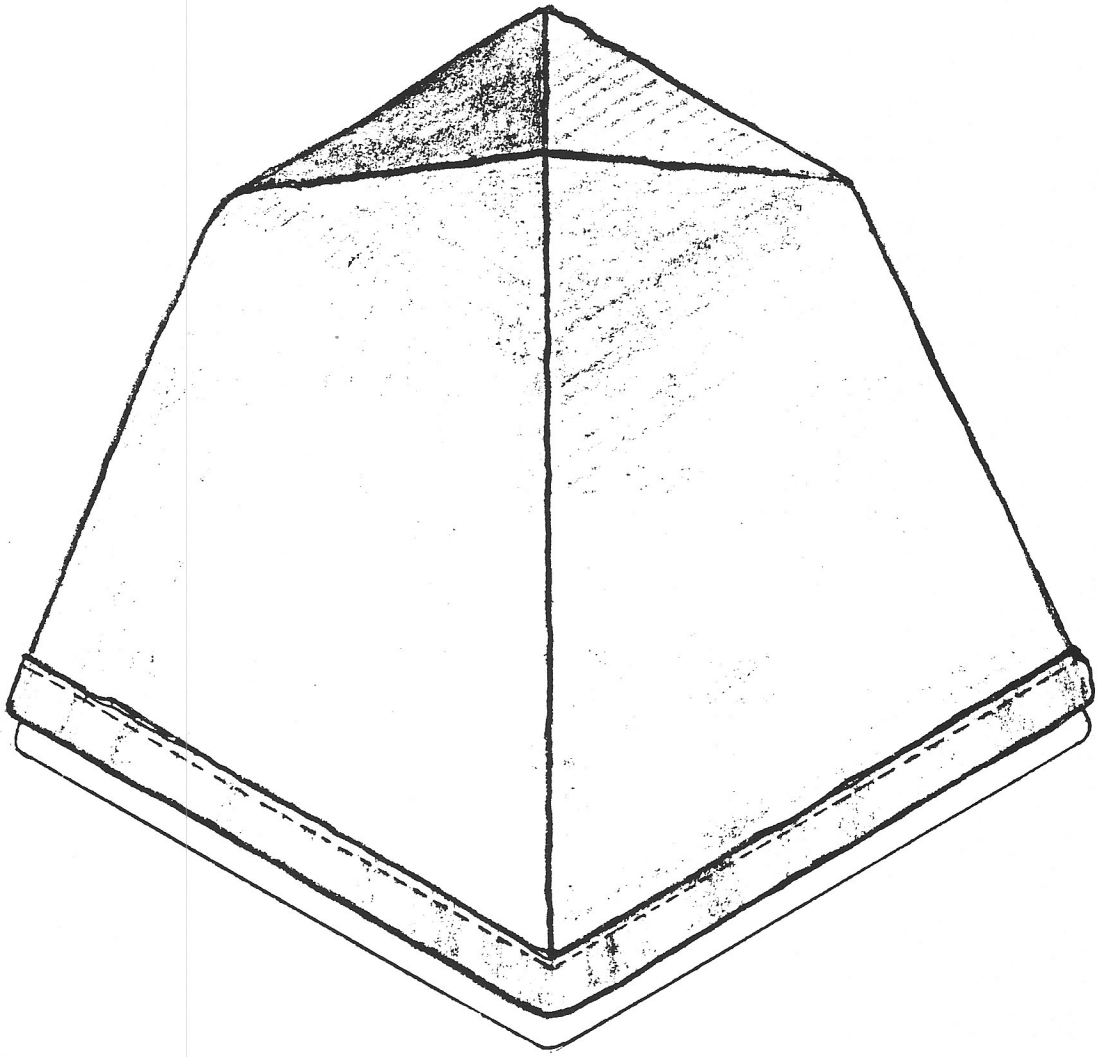
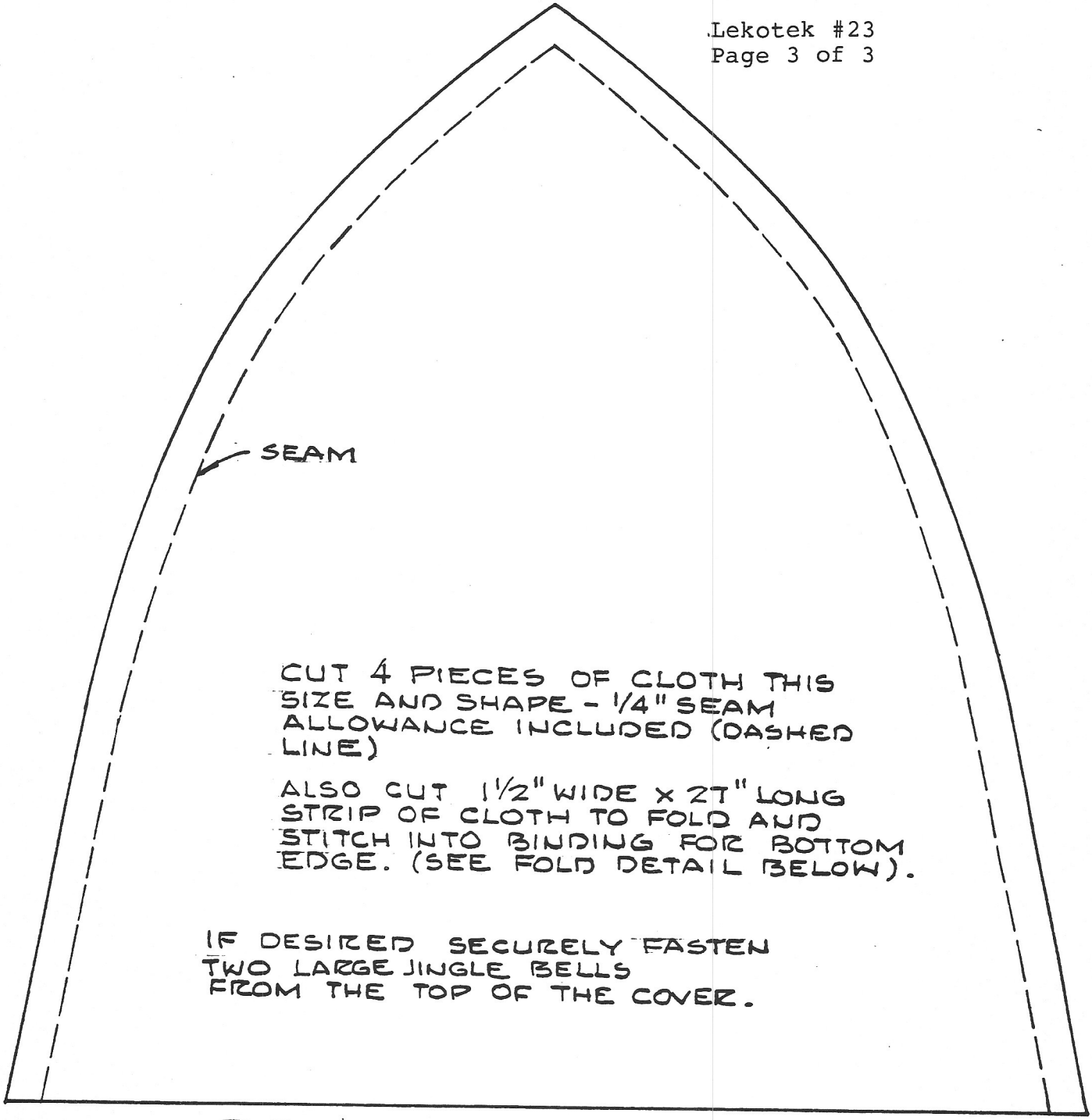
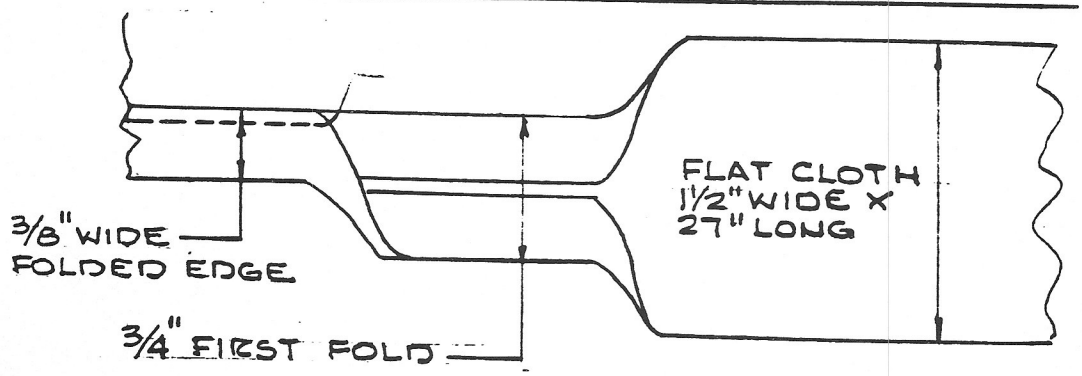


TURN N LEARN TOY WITH COVER


SEAM
CUT 4 PIECES OF CLOTH THIS SIZE AND SHAPE - 1/4" SEAM ALLOWANCE INCLUDED (DASHED LINE)
ALSO CUT 1 1/2" WIDE X 27" LONG STRIP OF CLOTH TO FOLD AND STITCH INTO BINDING FOR BOTTOM EDGE. (SEE FOLD DETAIL BELOW).
IF DESIRED SECURELY FASTEN TWO LARGE JINGLE BELLS FROM THE TOP OF THE COVER.

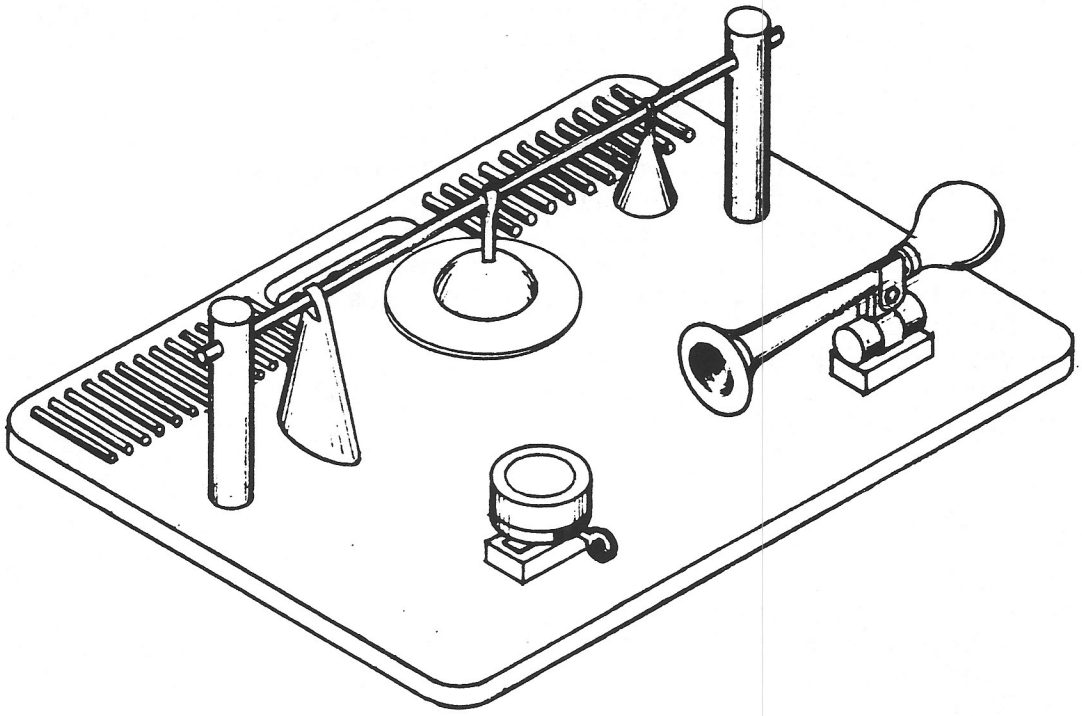
TURN N LEARN COVER PATTERN



FOLDING OF EDGE DETAIL

NOISE BOARD

This board is full of assorted noisemakers that let a child discover the sounds that several different devices make when hit, or squeezed, or pushed, or rubbed.



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Materials needed:

- One piece of 3/8" thick x 20" x 14" birch plywood
- Two pieces 5 1/4" long 1" diameter dowel
- One piece 18" long 1/2" diameter dowel
- 19 pieces 2 1/2" long 3/16" diameter dowel and flattened on one side
- 12 pieces of 2 1/2" long 5/16" diameter dowel and flattened on one side
- Two pieces 1/2" x 2" x 1" birch plywood
- Four 3/4" x #6 tapping screws with countersunk heads
- Two 1 1/4" x #10 sheet metal screws
- Two 3/4" x #6 sheet metal screws
- Five 3/8" x #4 sheet metal screws
- Elmer's Carpenter's Glue or equal
- One bicycle horn, Schwinn #05005 or equal
- One bicycle bell, Schwinn or equal
- One 5" diameter cymbal, from toy store
- One cow bell, from Pier 1 Imports (see page 6) or equal
- One brass bell, from Pier 1 Imports
- Sandpaper
- Varathane gloss varnish or equal
- One piece 20" x 14" non-skid material
- Contact cement

Tools needed:

- Table saw
- Set of drill bits and drill
- Saber saw with fine tooth blade
- Sanding block
- Brush
- Screwdriver
- A mechanical sander would help to flatten the dowels

Construction suggestions:

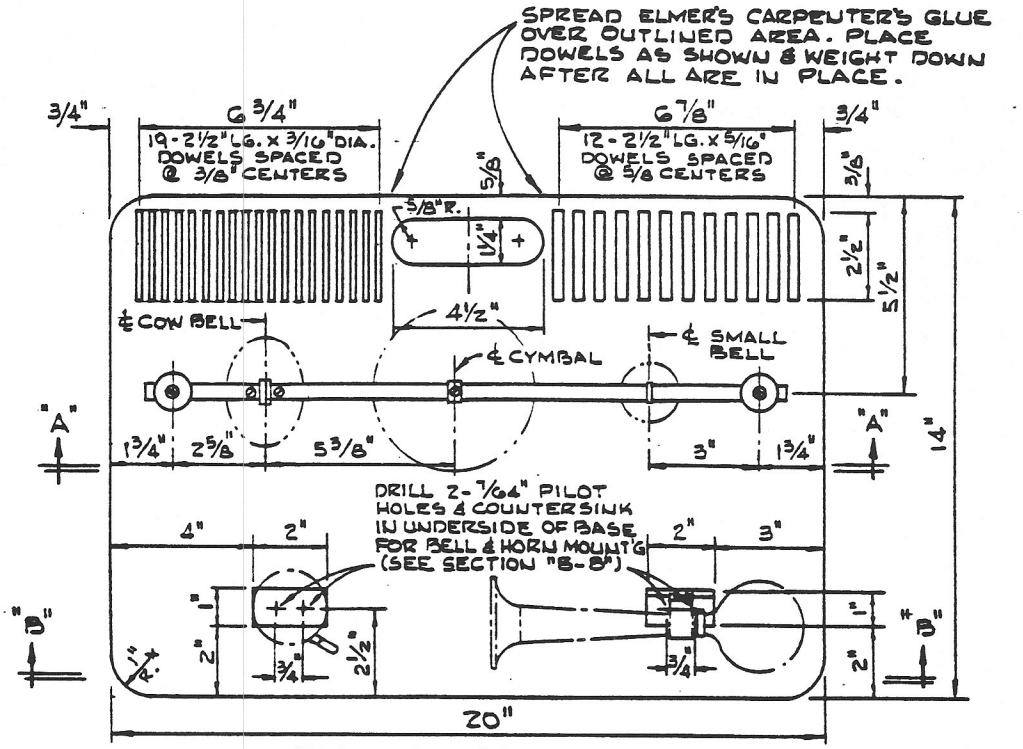
On the large piece of 3/8" plywood, make a layout as detailed on page 4. Using a 5/8" hand drill bit, drill two holes for the hand hole half way through from each side to assure a smooth cut. Then cut the remainder of the hand hole and the corner curves with a saber saw. Sand all edges smooth.

With the 3/16" and the 5/16" dowels in their full uncut length, sand a flat area on each lengthwise, then cut to length, all as shown on page 5.

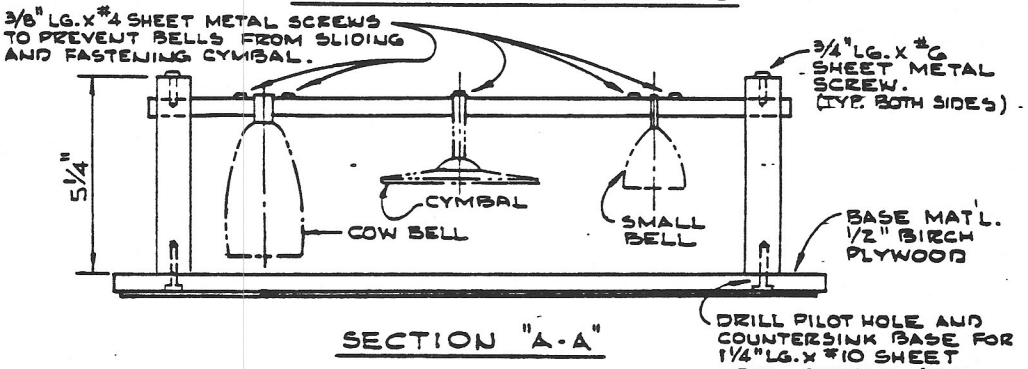
Glue the flattened and cut dowel pieces in the outlined areas as detailed on page 4.

Cut, drill and install the bell and cymbal holding dowels as detailed on page 4, Section "A-A". Mount the bell and the horn as detailed on page 4, Section "B-B".

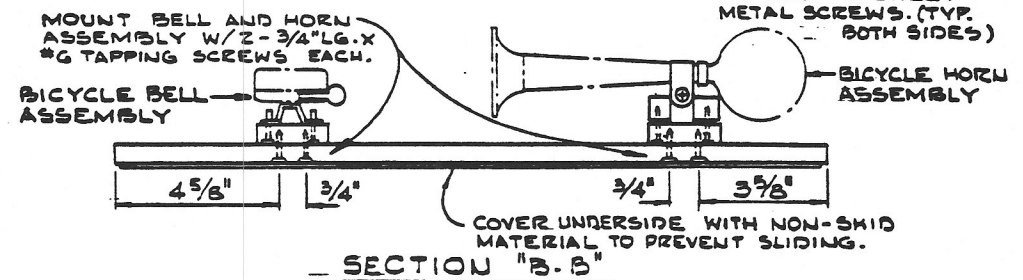
Apply two coats of Varathane Gloss Varnish, or equal, to all wood areas, sanding lightly between coats.



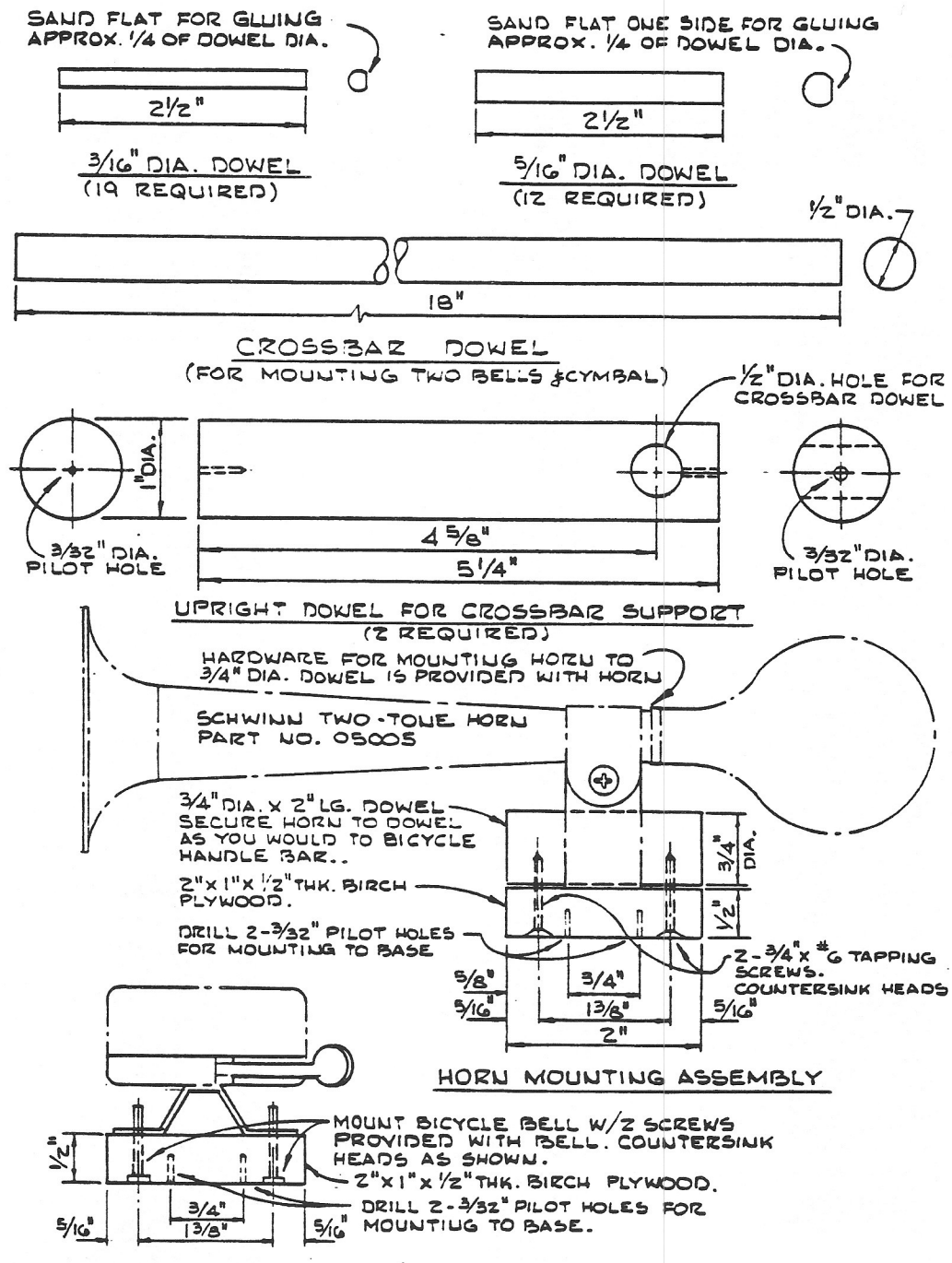
TOP VIEW OF NOISE BOARD


3/8" LG. x #4 SHEET METAL SCREWS TO PREVENT BELLS FROM SLIDING AND FASTENING CYMBAL.
3/4" LG. x #6 SHEET METAL SCREW. (TYP. BOTH SIDES)
5 1/4"
CYMBAL
COW BELL
SMALL BELL
BASE MAT'L. 1/2" BIRCH PLYWOOD
DRILL PILOT HOLE AND COUNTERSINK BASE FOR 1 1/4" LG. x #10 SHEET METAL SCREWS. (TYP. BOTH SIDES)

SECTION "A-A"


MOUNT BELL AND HORN ASSEMBLY W/ 2 - 3/4" LG. x #6 TAPPING SCREWS EACH.
BICYCLE BELL ASSEMBLY
BICYCLE HORN ASSEMBLY
4 5/8"
3/4"
3/4"
3 5/8"
COVER UNDERSIDE WITH NON-SKID MATERIAL TO PREVENT SLIDING.

SECTION "B-B"


SAND FLAT FOR GLUING APPROX. 1/4 OF DOWEL DIA.
2 1/2"
3/16" DIA. DOWEL
(19 REQUIRED)
SAND FLAT ONE SIDE FOR GLUING APPROX. 1/4 OF DOWEL DIA.
2 1/2"
5/16" DIA. DOWEL
(12 REQUIRED)
1/2" DIA.
18"
CROSSBAR DOWEL
(FOR MOUNTING TWO BELLS & CYMBAL)
1/2" DIA. HOLE FOR CROSSBAR DOWEL
1" DIA.
3/32" DIA. PILOT HOLE
4 5/8"
5 1/4"
3/32" DIA. PILOT HOLE
UPRIGHT DOWEL FOR CROSSBAR SUPPORT
(2 REQUIRED)
HARDWARE FOR MOUNTING HORN TO 3/4" DIA. DOWEL IS PROVIDED WITH HORN
SCHWINN TWO-TONE HORN
PART NO. 05005
3/4" DIA. X 2" LG. DOWEL SECURE HORN TO DOWEL AS YOU WOULD TO BICYCLE HANDLE BAR..
2"x 1"x 1/2" THK. BIRCH PLYWOOD.
DRILL 2-3/32" PILOT HOLES FOR MOUNTING TO BASE
3/4" DIA.
1/2"
2-3/4" x #6 TAPPING SCREWS. COUNTERSINK HEADS
5/8"
5/16"
3/4"
1 3/8"
2"
5/16"
HORN MOUNTING ASSEMBLY
MOUNT BICYCLE BELL W/2 SCREWS PROVIDED WITH BELL. COUNTERSINK HEADS AS SHOWN.
2"x 1"x 1/2" THK. BIRCH PLYWOOD.
DRILL 2-3/32" PILOT HOLES FOR MOUNTING TO BASE.
1/2"
5/16"
3/4"
1 3/8"
5/16"
BICYCLE BELL MOUNTING ASS'Y.

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*Associate Store

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Oak Park — 21150 Greenfield Rd.
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Memphis — 4659 American Way Plaza
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Austin — 2220 Hancock Dr.
5789 Airport Blvd.
Beaumont — 3777 College St.
*Bryan — Manor East Mall, TX Ave. & Ville Maria Rd.
Corpus Christi — 5717 S. Padre Island Dr.
Dallas — 13330 Preston Rd.
4325 Lovers Lane
1152 N. Buckner
138 Medallion Center
El Paso — 9515 Gateway West
Fort Worth — 2500 West Freeway
306 N. Hills Mall
Garland — 124 Northwest Hwy.
Houston — 8320 SW Frwy-Gessner Rd.
5650 FM 1960
1743 S. Post Oak Rd.
8456 Gulf Freeway
5403 Rice Ave.
1016 Gessner Rd.
12558 Westheimer
5009-H Antoine Dr.
2501 Rice Blvd.
6850 State Hwy. 6 South
25000 Hwy. 75 North
Lubbock — 3407 50th Street
*Longview — 1503 West Loop 281
Midland — 1215 N. Midkiff
Richardson — 1710 E. Belt line Rd.
San Antonio — 3219 Wurzbach
6715 San Pedro
4941 Walzem Rd.
12311 Nacogdoches Rd.
Tyler — 3809 S. Broadway
*Victoria — 4404 N. Navarro
Waco — 4300 W. Waco Dr.

UTAH
Murray — 6230 S. State St.
*Orem — Parkway Plaza, 230 E. 1300 South
Salt Lake City — 30 West 900 South

VERMONT
*Burlington — 1324 Burlington Mall

VIRGINIA
Alexandria — 7844-A Richmond Hwy.
Arlington — 3045 Columbia Pike
Falls Church — 7253 Arlington Blvd.
Norfolk — 170 Janaf Shop Center
Richmond — 7496 W. Broad St.
8278 Midlothian Turnpike

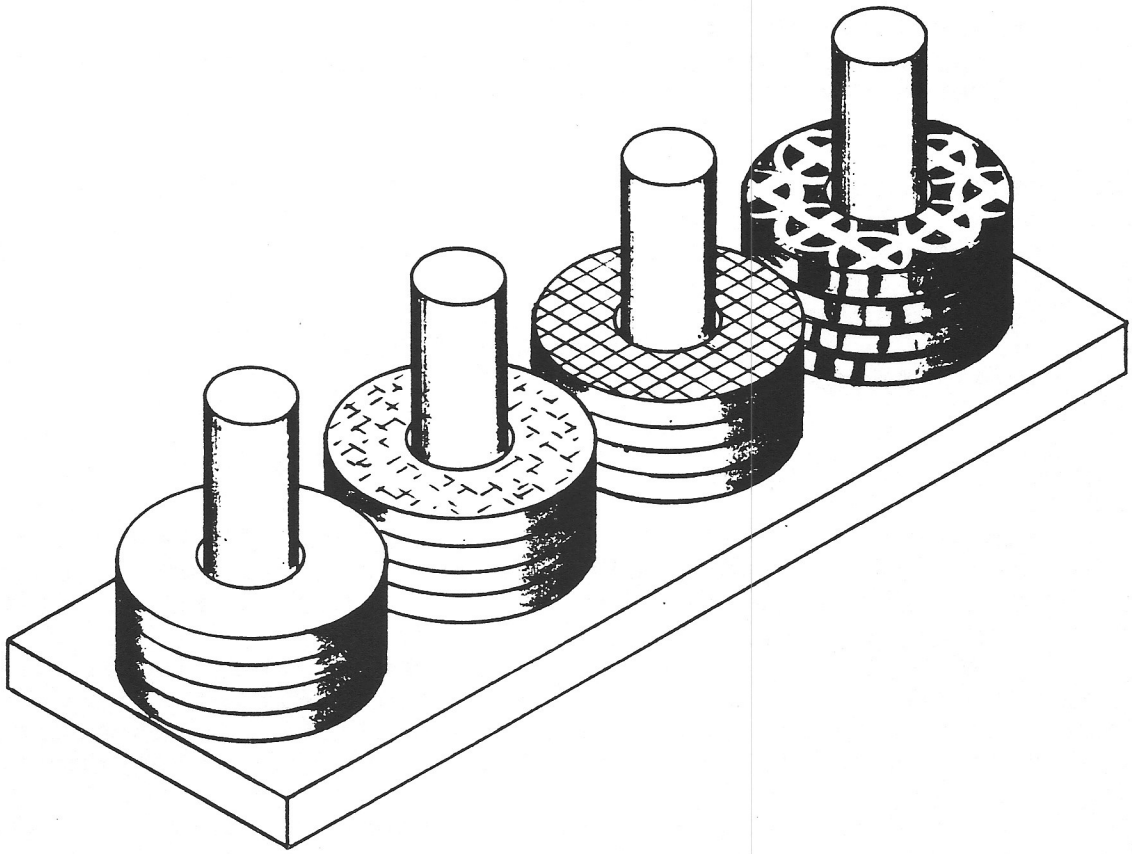
WASHINGTON
Bellevue — 905 Bellevue Way NE
Seattle — 2815 Alaska Way Pier 70
4345 University Way NE
Spokane — 701 North Division

WISCONSIN
Madison — 1902 W. Beltline Hwy.
Milwaukee — 6010 North Port Wash Rd.

CANADA
Brampton Ontario — 41 City Centre
Calgary Alberta — 604 1st St. SW Main Flr.
7516 MacLeod Tri. So.
Edmonton Alberta — 10314 102 Ave.
Halifax NS — 1903 Barrington St.
Hamilton Ontario — 691 Queenston St.
London Ontario — 125 Dundas St.
Mississauga Ontario — 2130 Dundas St. East
Montreal Quebec — 6720 St. Hubert
Montreal West Quebec — 1106 Ste. Catherine St. W.
Ottawa Ontario — 184 Rideau
1558 Merivale Rd.
Pointe Claire Quebec — 183 F. Hymus Blvd.
Quebec City Quebec — 550 Blvd. Hamel
Rosemere Quebec — 401 Blvd. Labelle
Scarborough Ontario — 1921 Eglington Ave. E.
St. Burno Quebec — 177 Des Promenades
St. Lambert Quebec — 528 Victoria Ave.
Toronto Ontario — 3302 Dufferin St.
221 Yonge St.
1986 Queen St. E.
Vancouver BC — 57 Water St.
1994 W. 4th Ave.
Waterloo Ontario — 35 King St. S.
Westmount Quebec — 4823 Sherbrooke W.

TACTILE STACKER

Learning to discriminate by touch can be difficult. This toy helps make it fun. The tactile stacker has four sets of discs with surfaces of different textures. The child stacks the discs onto pegs, sorting by texture. The discs are all the same color to reinforce the tactile differences.



(c) 1986 National Lekotek Center

Materials needed:

- One piece 10" x 3 3/8" x 1/2" birch plywood
- Four pieces 3/4" diameter x 2 3/4" long dowels
- Two pieces 3" x 3" x 1/4" thick plywood
- Eight pieces 2 3/4" x 2 3/4" x 3/16" thick perforated masonite (These can be cut from a piece 6" x 12".)
- Eight pieces, each of two patterns, 2 3/4" x 2 3/4" x about 1/16" to 1/8" thick of patterned plastic used for diffusing light, as in a fluorescent fixture or a room divider. Purchase in a hardware store.
- Eight pieces 2 3/4" x 2 3/4" x 1/8" clear plexiglas
- Four pieces 2 3/4" x 2 3/4" x 1/4" thick birch plywood
- About 1/2" of 3/16" diameter dowel
- Plastic cement or "Superglue"
- Spray can of Varathane enamel or equal, one color
- Elmer's Carpenter's glue or equal

Tools needed:

- Table saw
- Circle cutter
- Vise or clamps
- 3/8", 3/4", and 7/8" diameter drills
- Drill press

Construction suggestions:

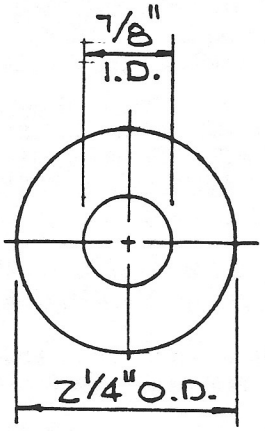
Either cut out all of the 2 3/4" x 2 3/4" pieces and then drill each 2 1/4" diameter disc, or make a layout of centerpoints on a 6" x 12" piece and cut out the discs directly using a circle cutter adjusted to 2 1/4" diameter.

The circle cutter has a pilot drill that makes a 3/16" diameter hole in the center of each disc. Except for the plain plywood disc that is 1/4" thick, each of the finished discs is made up of two or three cut-out discs that have been cemented or glued together.

To assure that these discs are properly aligned for gluing, make a simple alignment device, as detailed on the top of page 4. To one 3" x 3" piece, glue a 3/16" diameter dowel that is long enough to go through the two or three cut-out discs and into the other 3" x 3" alignment piece. This is used by applying cement or glue to the cut-out discs, placing them on the 3/16" dowel stub in one face piece and covering the discs with the other piece. Then clamp the alignment device in a vice until the cement sets.

After the disc pieces are all glued, drill a 7/8" hole down the 3/16" pilot hole of each disc assembly.

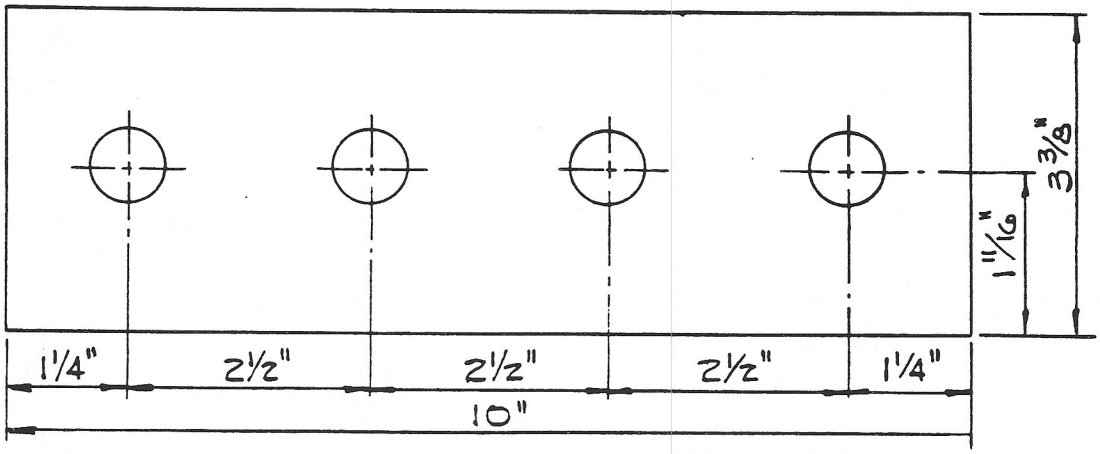
Spray paint all the discs the same color.



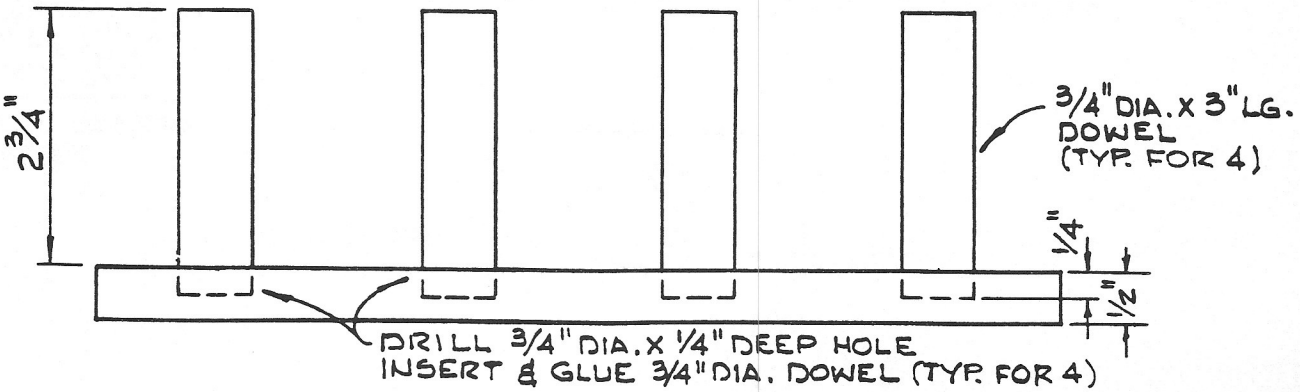
TEXTURED DISC
(TYPICAL SIZE)

NOTE:

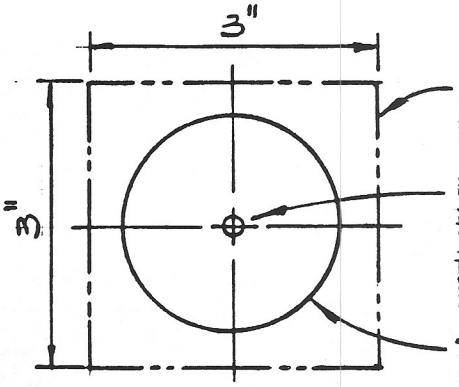
16 DISCS REQUIRED FOR THIS TOY. DISCS ARE OF FOUR DIFFERENT TEXTURES AND CONSTRUCTION. FOUR DISCS EACH OF ALIKE TEXTURE.
SEE CONSTRUCTION DETAILS.



TOP VIEW OF DISC STAND



FRONT VIEW OF DISC STAND



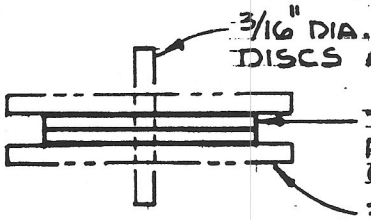
3"x3"x1/4" THK. PLYWOOD FOR CLAMPING DISCS TOGETHER WHILE GLUING.

3/16" DIA. HOLE THROUGH 3"x3" PLYWOOD AND ALL DISC MATERIAL (3/16" DIA. HOLE THROUGH DISC MAT'L IS MADE BY CIRCLE CUTTER WHEN CUTTING DISCS)

2 1/4" DIA. DISCS (SEE MATERIALS BELOW FOR VARIOUS TEXTURES).

TOP VIEW

NOTE: DRILL 7/8" DIA. HOLE THROUGH ALL DISCS AFTER GLUING

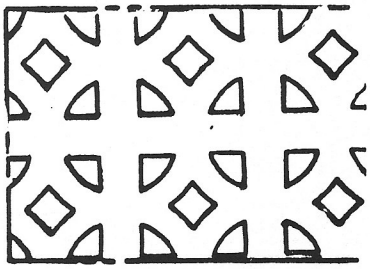


3/16" DIA. PEG THROUGH ALL HOLES TO LINE UP DISCS AFTER GLUE IS APPLIED.

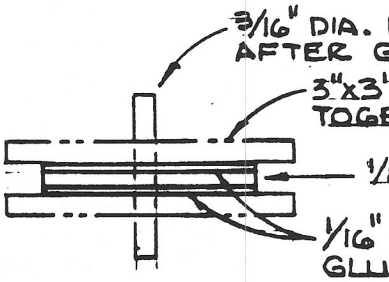
TWO DISCS OF 3/16" THK PERFORATED MASONITE GLUED TOGETHER

3"x3" PLYWOOD PIECES FOR CLAMPING DISCS TOGETHER AFTER GLUING

SIDE VIEW OF PERFORATED MASONITE DISC CLAMPING (4 DISCS REQUIRED)



ACTUAL PATTERN OF MASONITE



3/16" DIA. PEG TO LINE UP DISCS AFTER GLUE IS APPLIED

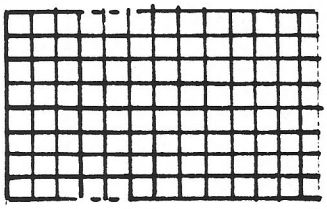
3"x3" PLYWOOD PIECES FOR CLAMPING DISCS TOGETHER AFTER GLUING.

1/8" THK PLEXIGLAS

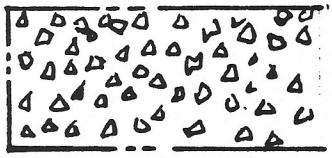
1/16" THK. LIGHT PANEL GLUED TO BOTH SIDES OF PLEXIGLAS

SIDE VIEW OF LIGHT PANEL DISCS TO PLYWOOD DISC CLAMPING

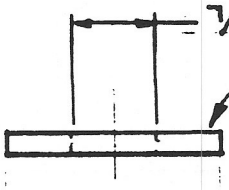
(4 DISCS REQ'D W/WAFER PATTERN)
(4 DISCS REQ'D W/CRACKED ICE PATTERN)



APPROX. WAFER PATTERN



APPROX. CRACKED ICE PATTERN



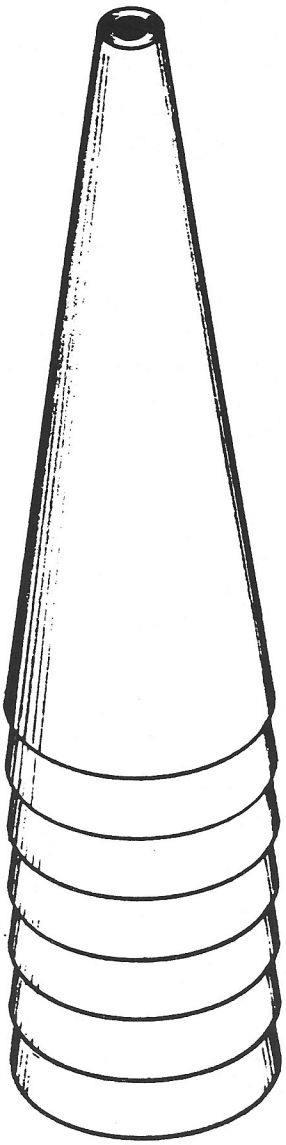
7/8" DIA. HOLE

2 1/4" DIA. x 1/4" THK PLYWOOD DISC (ONE PIECE - DOES NOT REQUIRE GLUING).

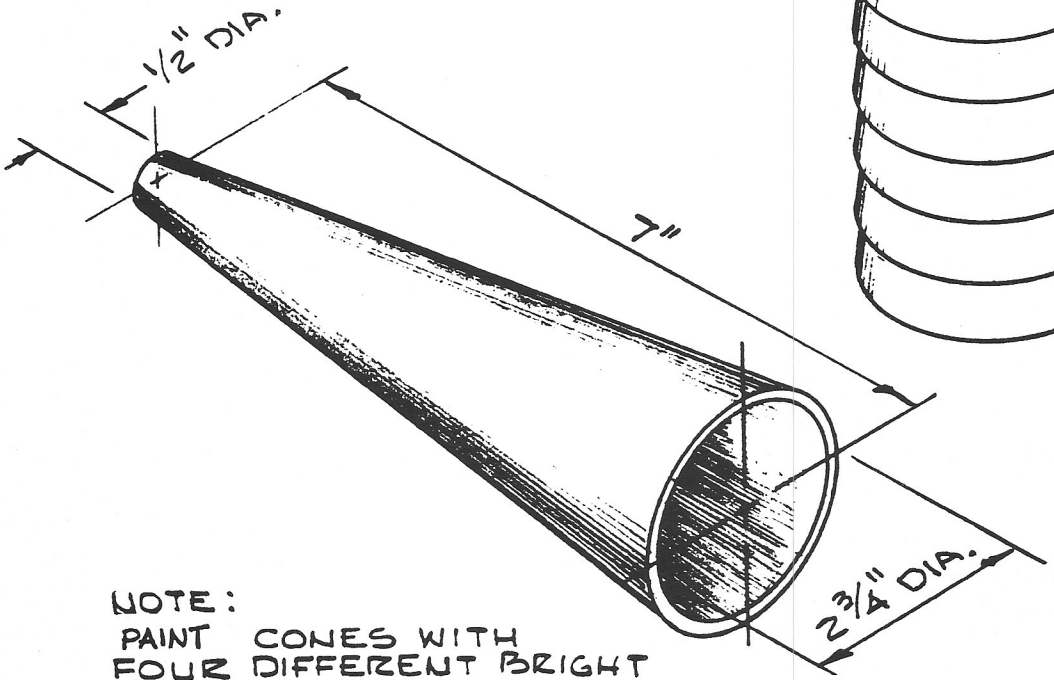
SIDE VIEW PLYWOOD DISC (4 REQUIRED)

COLORED CONES

Simple cones like these when given bright colors are a child's delight. They can be stacked or lined up, rolled in circles, talked into and looked through. There are no batteries to run down or wind-ups to bother with. They are helpful with color identification, grasp-and-place skills, and many imaginative play games.



SET OF 8 CARDBOARD
HAND CONES NO. 1613
ADLAIDES INC.
P.O. BOX 2788
GLEN ELLYN, IL.
60136



NOTE:
PAINT CONES WITH FOUR DIFFERENT BRIGHT COLORS AND VARNISH CONES IN PAIRS OF ALIKE COLOR.

(c) 1986 National Lekotek Center

Materials needed:

These cones can be ordered in sets of 10 cones from ADLaides Company, Inc., PO Box 2788, Glen Ellyn, IL 60138. Order item # 1613 Cardboard Hand Cone. The cost (less shipping) was $1.50 per set in 1985.

Tools needed:

- A paint brush and some mineral spirits to clean the brush after use
- Five bright colors of Varathane paint or equal
- Varathane Gloss varnish or equal

Construction suggestions:

Paint the cones in pairs and put aside to dry. When thoroughly dry, give each a light coat of varnish. The Varathane varnish is especially tough and will keep the paint from wearing off.

CLOWN BOX

This electronic box with a clown face has several features that make it a good toy selection for a child with physical disabilities.

1. Only a light touch is necessary to activate any of the four switch panels.

2. The switch panels are right in front, so even a child who has difficulty extending his arms will be able to reach them.

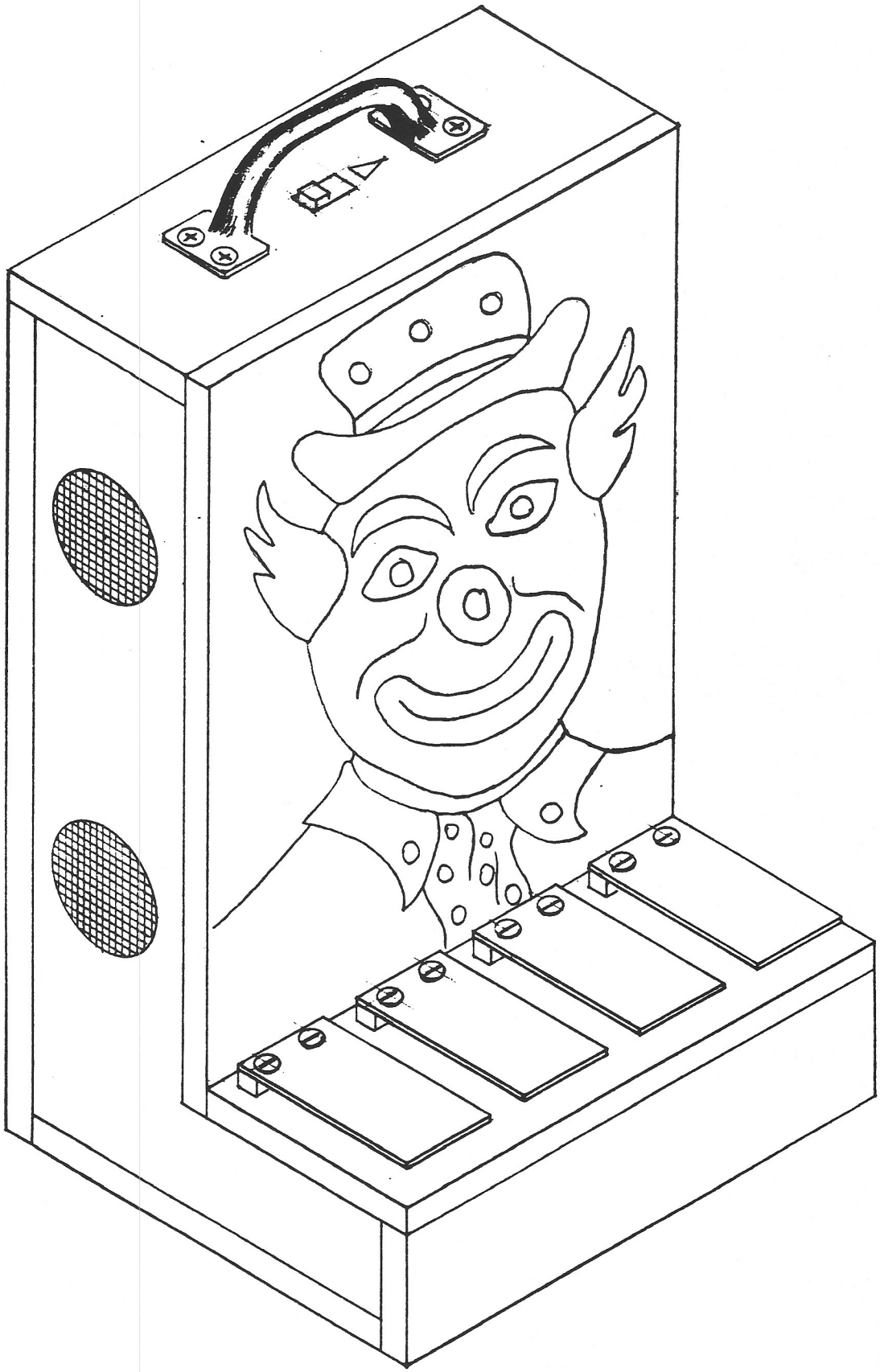
3. Pressing a brightly colored switch panel activates an area of the clown face that is similarly colored.

4. In addition to turning on lights on the clown face, pressing a switch panel results in a chime sound, a beep, a rattle, or a buzz.

5. More than one switch panel can be pressed at the same time and the resultng noise-and-light combination makes for great fun!

A small off-on switch is located under the carrying handle on top of the box. Switching to "off" after use assures that the batteries won't be used up if an object is accidentally laid on one of the switch panels.

(c) 1986 National Lekotek Center



Materials needed:

- Approximately 2' x 2' of 3/8" birch plywood
- Elmer's Carpenter's glue
- Varathane enamel or equal in 4 colors: red, blue, green and yellow
- Varathane gloss varnish or equal
- Seven 1" x #4 flat head wood screws
- Four pieces of aluminum screen wire, 3" x 3"
- Hot melt glue
- Four push switches. See pages 9 and 10 for details.
- One buzzer, Radio Shack #273-053
- One chime, Radio Shack #273-067
- One Piezo buzzer, Radio Shack #273-065
- Three threaded flashlight lamps, Radio Shack #272-1132
- Three threaded lamp sockets, Radio Shack #272-354
- Three green LED, Radio Shack #276-022A
- Three yellow LED, Radio Shack #276-021A
- Vibrator motor. See page 9 and 12 for details.
- Several feet of 22 gauge stranded wire, Radio Shack #278-1307
- Four pieces 1 1/4" x 2 1/2" x 1/16" Lexan, clear
- Four pieces 1 1/4" x 5/16" x 1/4" Lexan, clear
- Plexiglass cement or "Superglue"
- One 6" length of 1/4" O.D. x .040 wall clear plastic tube
- One 6" length of 5/16" O.D. x 3/16" I.D. clear plastic tube
- One 6" length of 3/8" O.D. x 1/4" I.D. clear plastic tube
- One 3/8" x #6 pan head sheet metal screw
- One 3/4" x #6 machine screw
- Two pieces .027" or .030" aluminum of size and shape as detailed on pages 11 and 12 (suggest using cut-off piece of gutter)
- Twelve 1/4" x #4 pan head sheet metal screws
- Eight 5/8" x #4 pan head sheet metal screws
- Three 1/4" x #2 (or cut to required size)
- One piece "Perfboard", Radio Shack #276-1395
- One piece 1 1/4" O.D. x 1" I.D. x 3 7/8" long Lexan tube
- One piece beryllium copper or brass shim stock for battery contact in battery tube. See page 11 for detail.
- One piece 22 gauge stainless or galvanized sheet metal 2 1/2" x 1 5/8" for battery door. See page 6 for detail.
- Rosin core solder
- One sash handle

Tools needed:

- Table saw
- Sander
- Electric drill and drill bit set
- Screwdriver, ruler, wire cutting pliers
- Hot melt glue gun
- Tin snips
- Soldering iron
- Flat file and round file
- Varnish brush and artist brush
- Carbon paper

Construction suggestions:

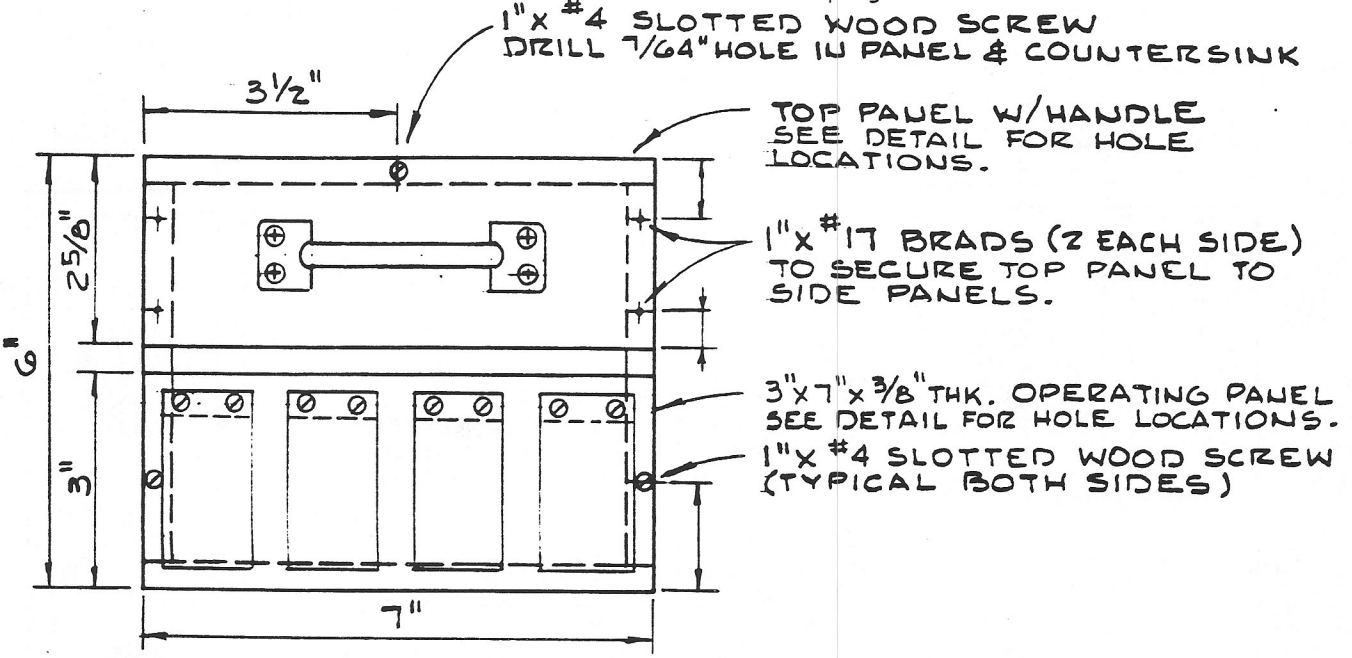
While this toy is not an easy one to make, it has been simplified with the unusually complete set of detailed drawings.

As with many of these toys, it is probably a good idea to make four at once, especially if several will be needed. This will help to conserve time and energy in buying parts and assembling materials.

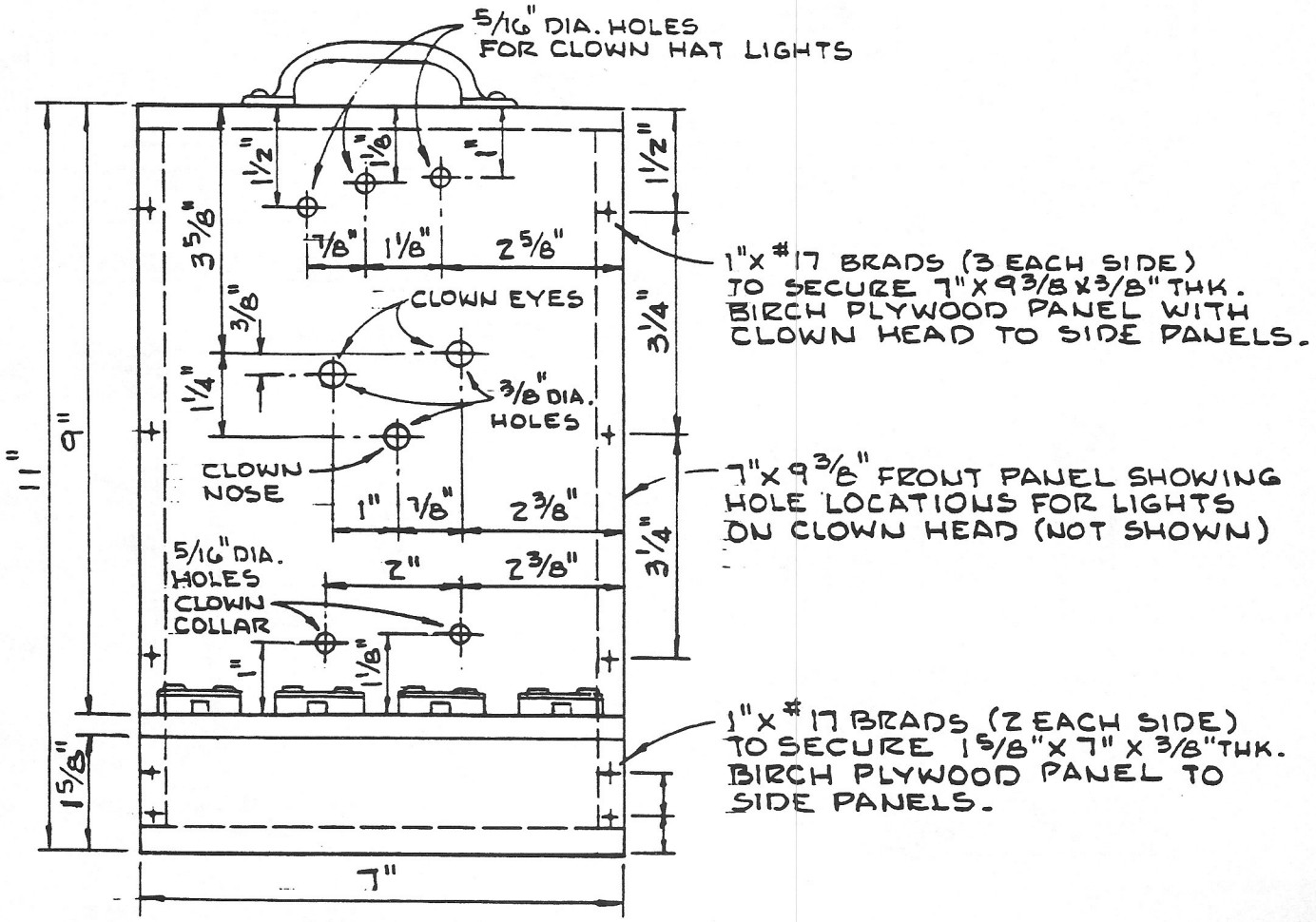
Make up the boxes first. Before assembly, trace the face from page 7 and, using the noted color scheme, paint the clown face on the front pieces and drill all the holes. Then glue and screw all the pieces together except for the backs and the bottoms.

Assemble and install the plastic and electronic components and wiring as detailed on the following pages.

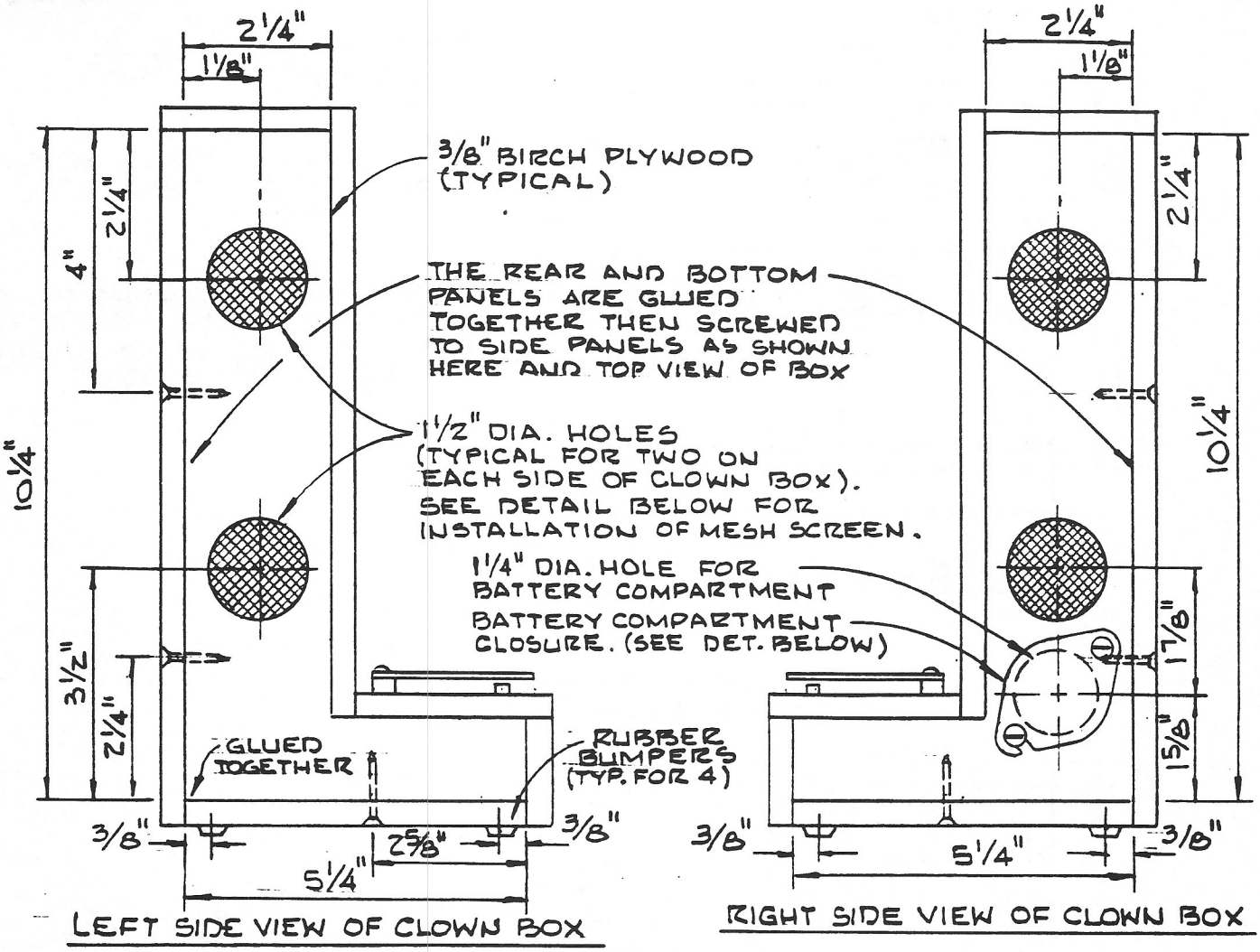
Screw the bottoms and the backs on to the boxes and varnish carefully.

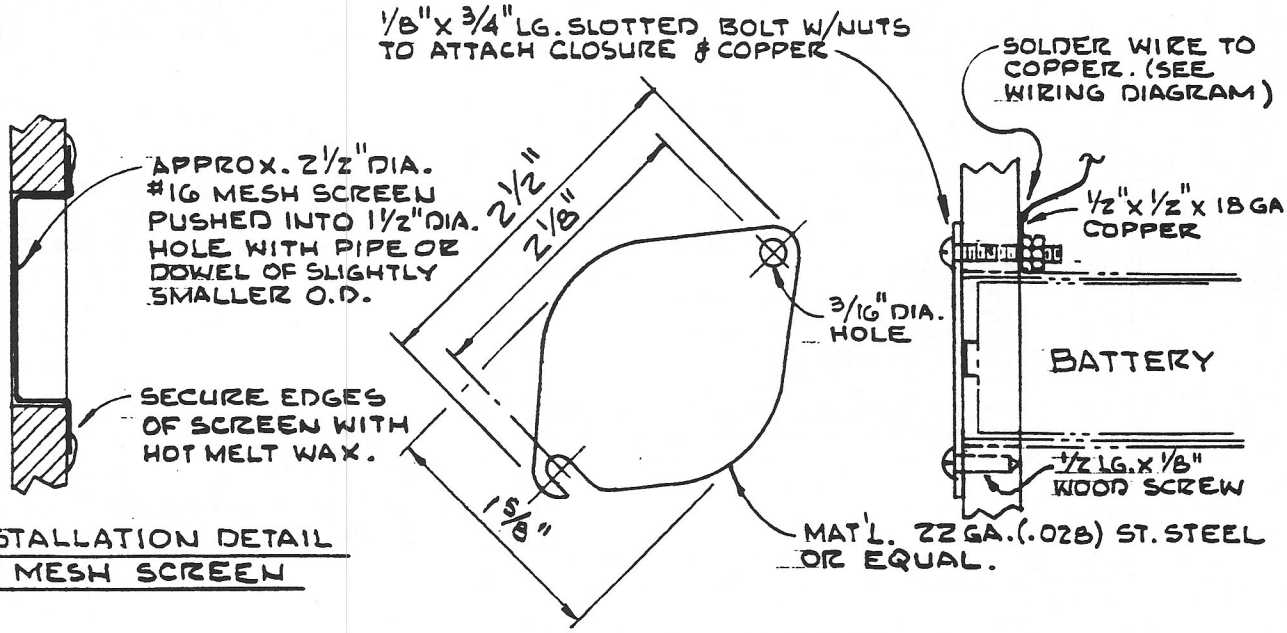


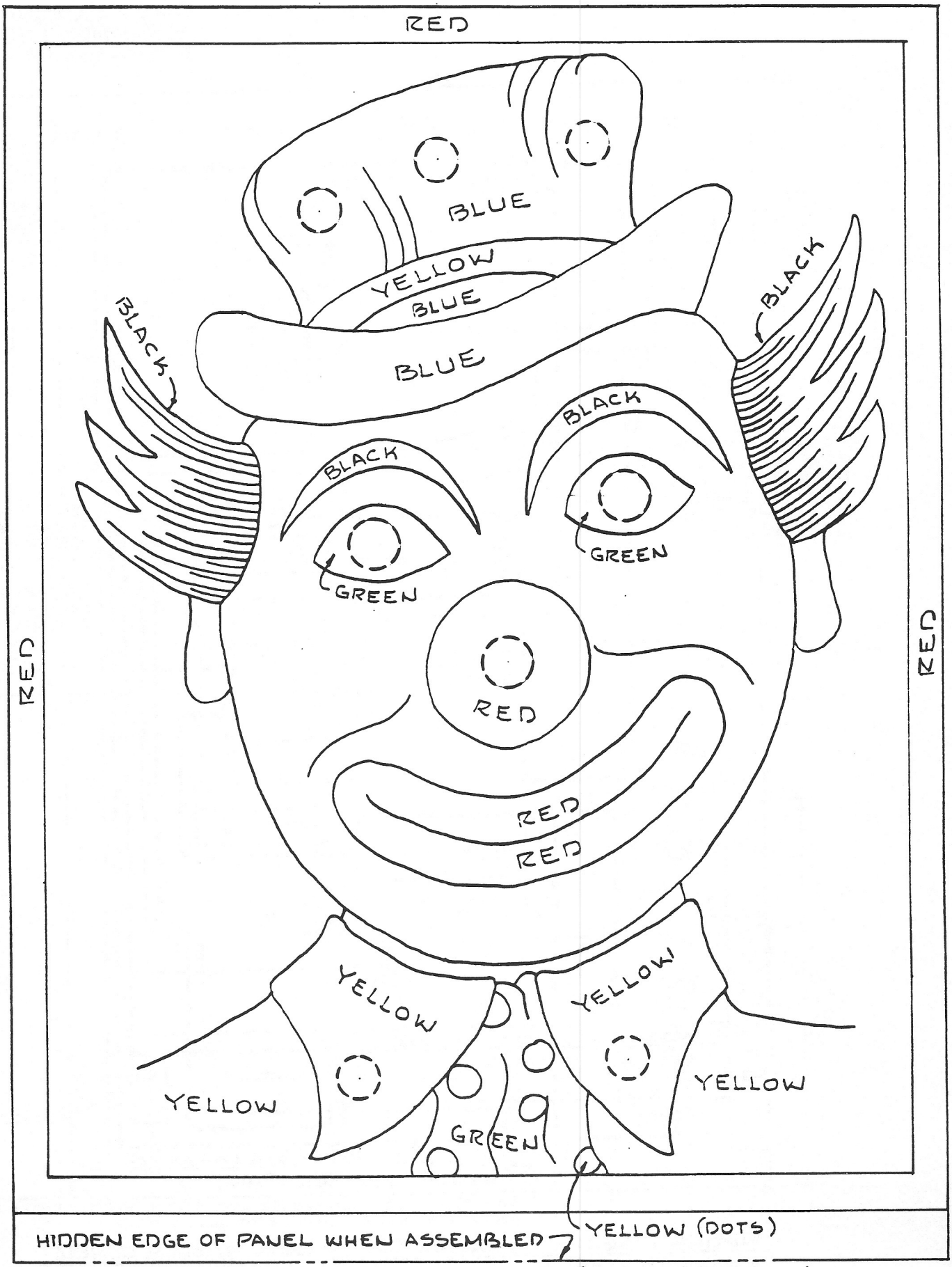
TOP VIEW OF CLOWN BOX



FRONT VIEW OF CLOWN BOX

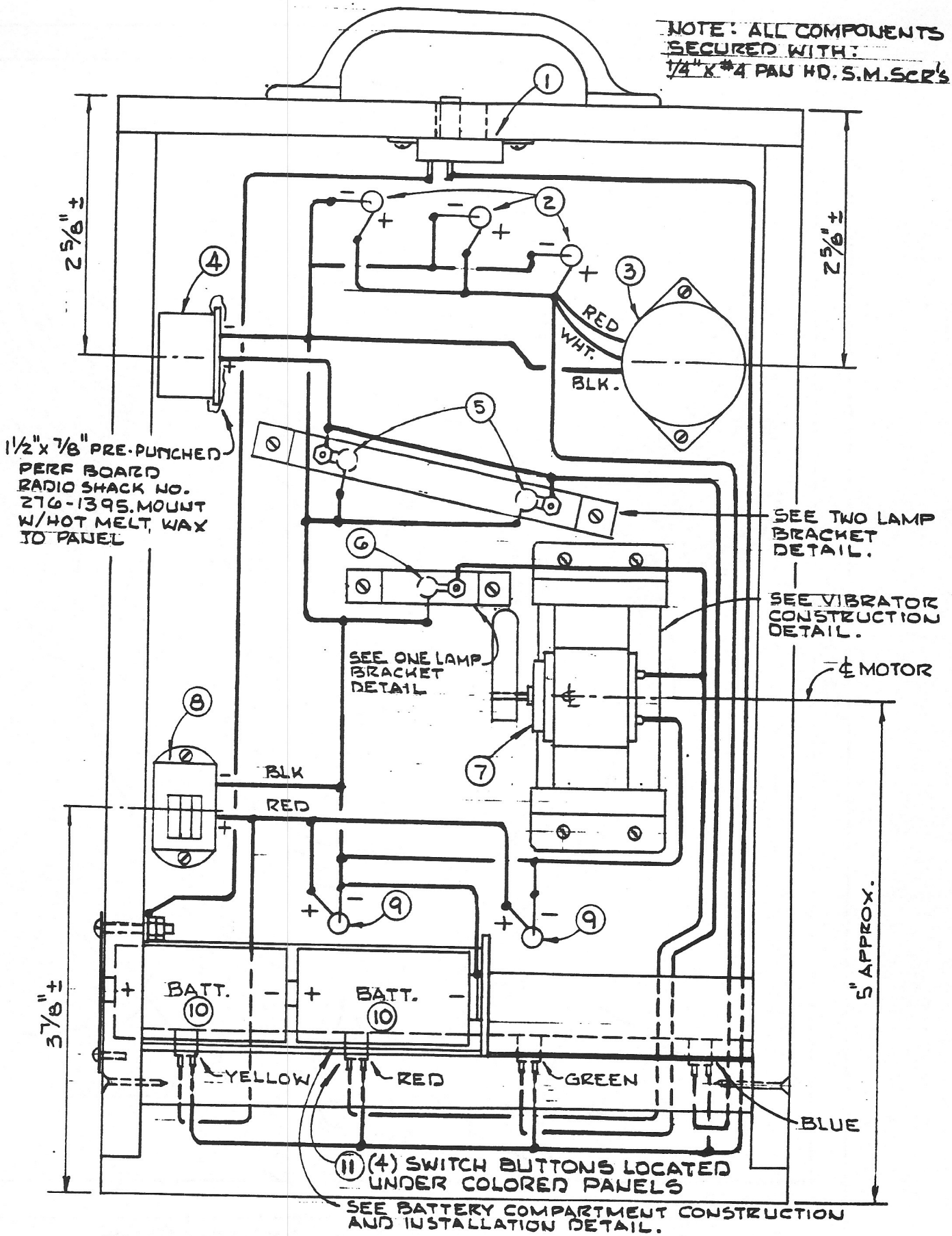

2¼"
1⅛"
3/8" BIRCH PLYWOOD (TYPICAL)
THE REAR AND BOTTOM PANELS ARE GLUED TOGETHER THEN SCREWED TO SIDE PANELS AS SHOWN HERE AND TOP VIEW OF BOX
1½" DIA. HOLES (TYPICAL FOR TWO ON EACH SIDE OF CLOWN BOX). SEE DETAIL BELOW FOR INSTALLATION OF MESH SCREEN.
1¼" DIA. HOLE FOR BATTERY COMPARTMENT
BATTERY COMPARTMENT CLOSURE. (SEE DET. BELOW)
10¼"
4"
2¼"
3½"
2¼"
GLUED TOGETHER
RUBBER BUMPERS (TYP. FOR 4)
3/8"
2⅝"
5¼"
1⅞"
1⅝"
LEFT SIDE VIEW OF CLOWN BOX
RIGHT SIDE VIEW OF CLOWN BOX


⅛"x¾" LG. SLOTTED BOLT W/NUTS TO ATTACH CLOSURE & COPPER
SOLDER WIRE TO COPPER. (SEE WIRING DIAGRAM)
APPROX. 2½" DIA. #16 MESH SCREEN PUSHED INTO 1½" DIA. HOLE WITH PIPE OR DOWEL OF SLIGHTLY SMALLER O.D.
SECURE EDGES OF SCREEN WITH HOT MELT WAX.
2½"
2⅛"
1⅝"
3/16" DIA. HOLE
½"x½"x 18 GA. COPPER
BATTERY
½" LG. x ⅛" WOOD SCREW
MAT'L. 22 GA. (.028) ST. STEEL OR EQUAL.
INSTALLATION DETAIL OF MESH SCREEN
DETAIL AND INSTALLATION OF BATTERY COMPARTMENT CLOSURE



FULL SIZE CLOWN HEAD (COLOR AS SHOWN)

TRANSFER CLOWN TO PLYWOOD PANEL WITH CARBON PAPER - BLACK LINES



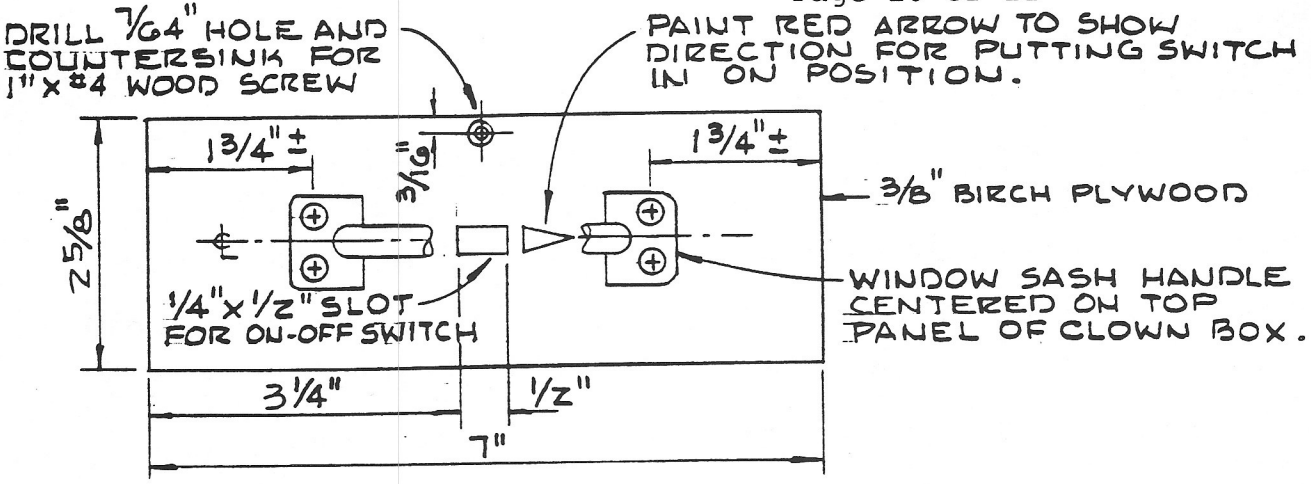
WIRING DIAGRAM - SHOWING CLOWN BOX W/BACK COVER REMOVED - SEE IDENTIFICATION OF COMPONENT ON NEXT PAGE

LIST OF NUMBERED COMPONENTS INSIDE CLOWN BOX (SEE WIRING DIAGRAM)

1. SLIDE SWITCH - SPST RADIO SHACK #275-401
2. 3 YELLOW LED - RADIO SHACK #276-0ZIA (HAT)
3. ELECTRONIC CHIME - RADIO SHACK #273-067
4. PIEZO BUZZER - RADIO SHACK #273-065
5. LAMPS - RADIO SHACK #272-1132 AND SOCKETS #272-354
6. LAMP - RADIO SHACK #272-1132 AND SOCKET #272-354
7. VIBRATOR MOTOR - MABUCHI RE-56 - JOHN J. MESHNA JR. INC.
   SEE DETAIL OF MOTOR MOUNTING
   19 ALLERTON ST.
   LYNN, MA. 01904
   CATALOG NO. SP-40
   FALL 1985 - PAGE 38
   ITEM NO. H-56-19
8. BUZZER - RADIO SHACK #273-053
9. 2 GREEN LED - RADIO SHACK #276-0ZZA (COLLAR)
10. 2 C SIZE BATTERIES
11. 4 SWITCHES - ALCO CAT. No. SP-119
    JOHN J. MESHNA JR. INC.
    SURPLUS ELECTRONIC MAT'L.
    P.O. BOX 62
    EAST LYNN, MA. 01904

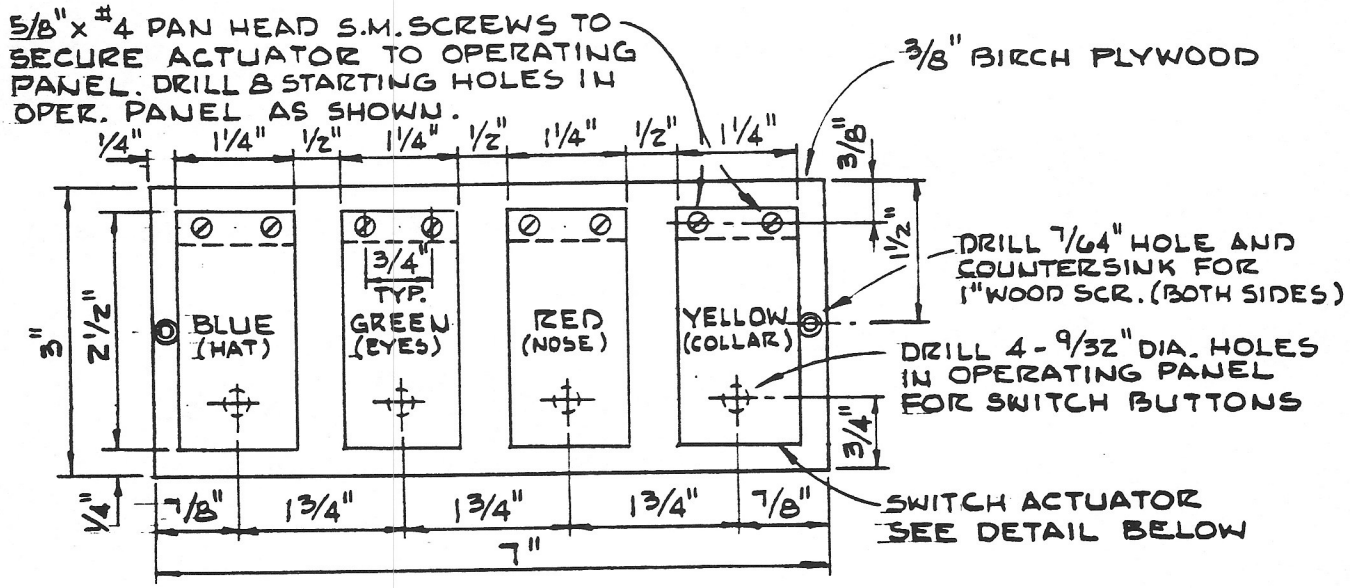
NOTES:

ALL WIRE IS 22 GA.
SOLDER ALL CONNECTIONS.
SECURE LOOSE WIRING TO PANEL WITH HOT MELT WAX.
SECURE COMPONENTS W/ 1/4"-#4 PAN HEAD S.M. SCREWS.


DRILL 7/64" HOLE AND COUNTERSINK FOR 1" X #4 WOOD SCREW
PAINT RED ARROW TO SHOW DIRECTION FOR PUTTING SWITCH IN ON POSITION.
13/4" ±
3/16" ±
13/4" ±
3/8" BIRCH PLYWOOD
2 5/8"
1/4" X 1/2" SLOT FOR ON-OFF SWITCH
WINDOW SASH HANDLE CENTERED ON TOP PANEL OF CLOWN BOX.
3 1/4"
1/2"
7"

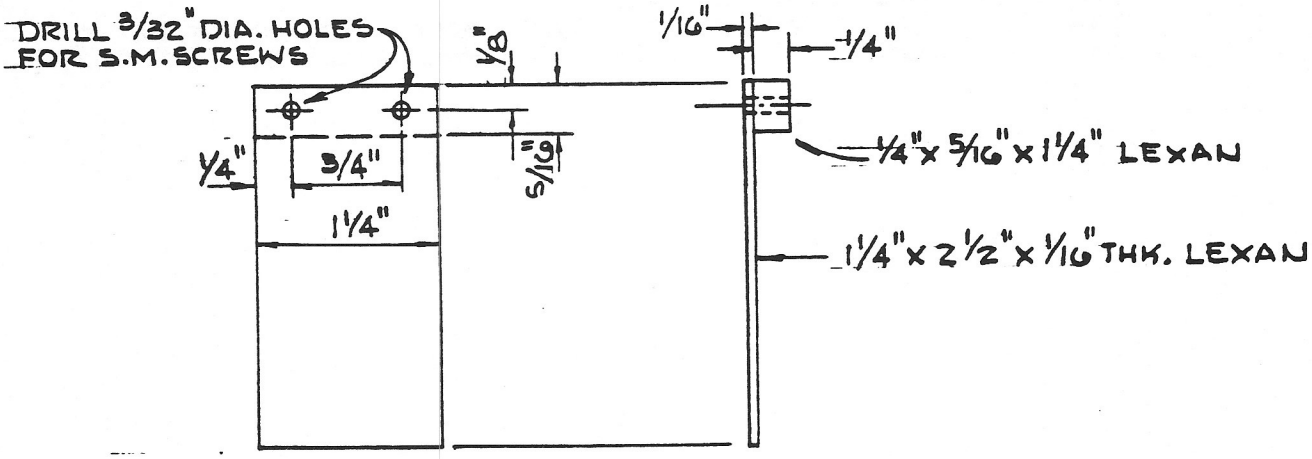
DETAIL OF 2 5/8" X 7" TOP PANEL WITH HANDLE

SEE TOP VIEW OF CLOWN BOX FOR MOUNTING LOCATION

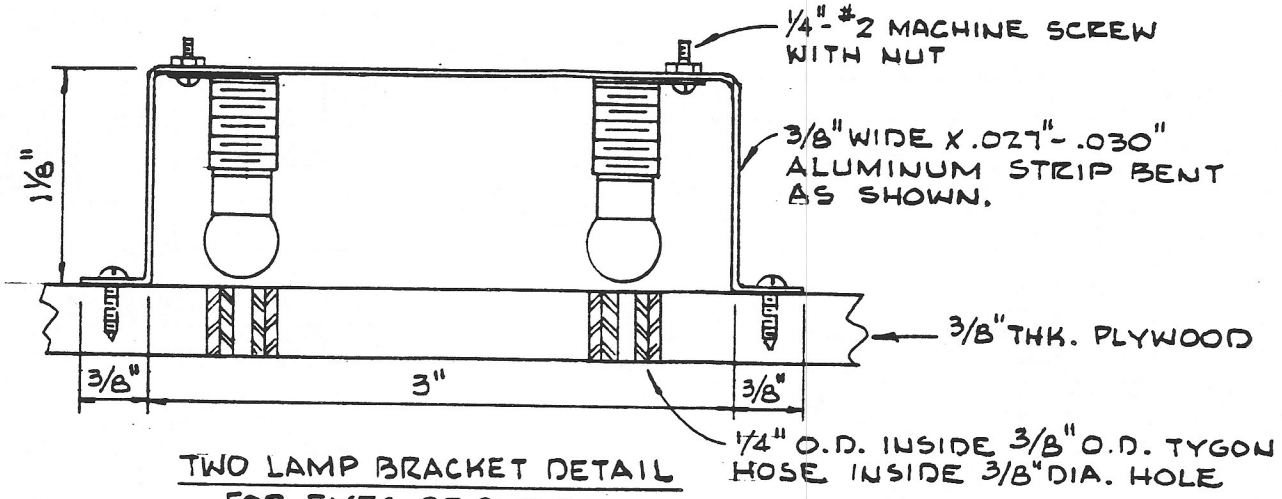


DETAIL OF 3" X 7" CONTROL PANEL

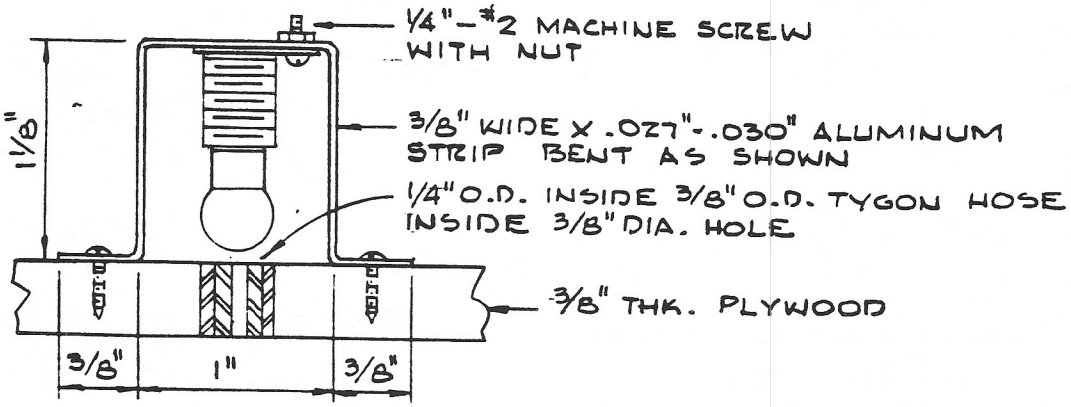
SEE TOP VIEW OF CLOWN BOX FOR MOUNTING LOCATION



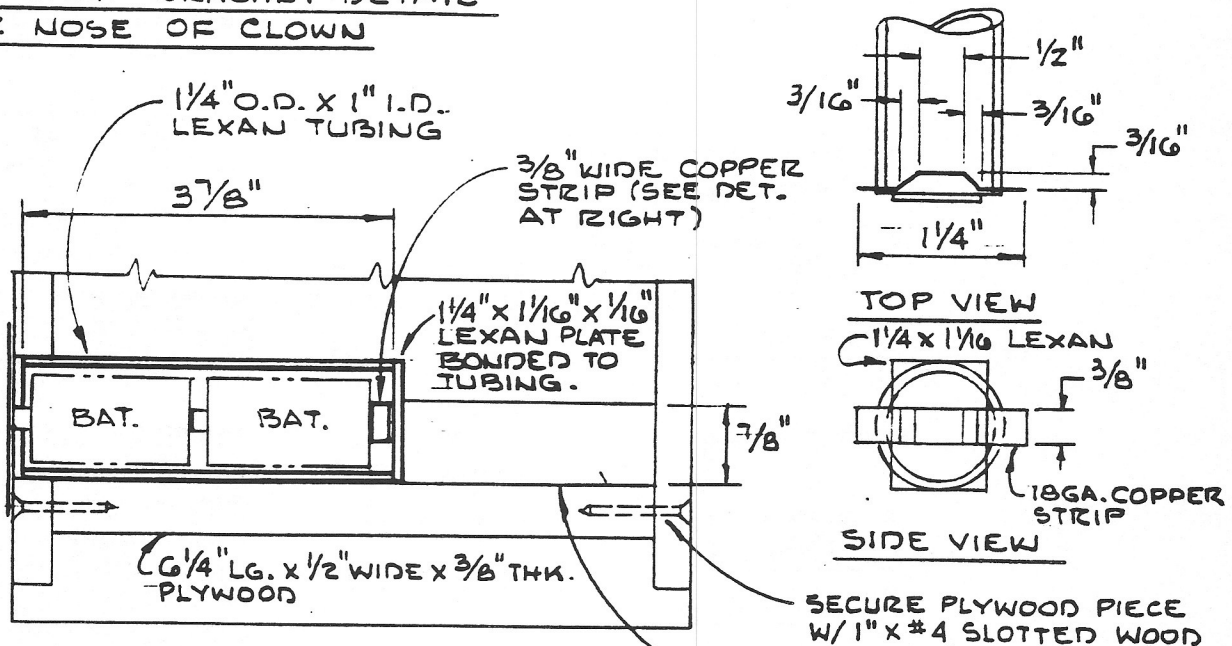
TOP AND SIDE VIEW OF SWITCH ACTUATOR


1/4"-#2 MACHINE SCREW WITH NUT
3/8" WIDE X .027"-.030" ALUMINUM STRIP BENT AS SHOWN.
1 1/8"
3/8" THK. PLYWOOD
3/8"
3"
3/8"
1/4" O.D. INSIDE 3/8" O.D. TYGON HOSE INSIDE 3/8" DIA. HOLE

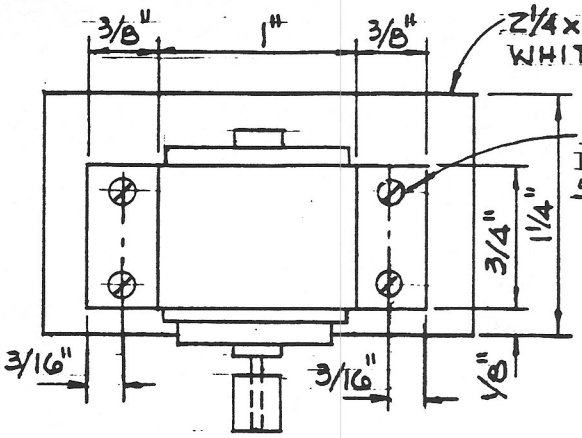
TWO LAMP BRACKET DETAIL
FOR EYES OF CLOWN


1/4"-#2 MACHINE SCREW WITH NUT
1 1/8"
3/8" WIDE X .027"-.030" ALUMINUM STRIP BENT AS SHOWN
1/4" O.D. INSIDE 3/8" O.D. TYGON HOSE INSIDE 3/8" DIA. HOLE
3/8" THK. PLYWOOD
3/8"
1"
3/8"

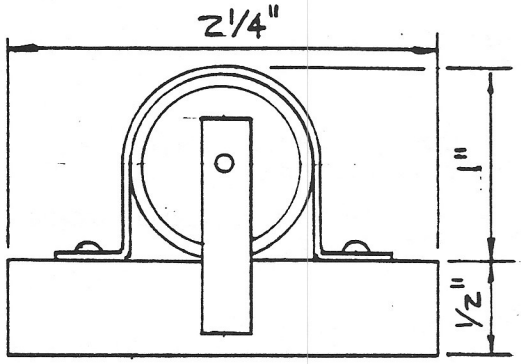
ONE LAMP BRACKET DETAIL
FOR NOSE OF CLOWN


1 1/4" O.D. X 1" I.D. LEXAN TUBING
3 7/8"
3/8" WIDE COPPER STRIP (SEE DET. AT RIGHT)
1 1/4" X 1 1/16" X 1/16" LEXAN PLATE BONDED TO TUBING.
BAT.
BAT.
7/8"
6 1/4" LG. X 1/2" WIDE X 3/8" THK. PLYWOOD
1/2"
3/16"
3/16"
3/16"
1 1/4"
TOP VIEW
1 1/4 X 1 1/16 LEXAN
3/8"
18GA. COPPER STRIP
SIDE VIEW
SECURE PLYWOOD PIECE W/ 1" X #4 SLOTTED WOOD SCREWS (ONE EACH SIDE).
7/8" X 1/2" WOOD PIECE TO HOLD BATT. COMPARTMENT IN PLACE

INSTALLATION DETAIL
OF BATTERY COMPARTMENT

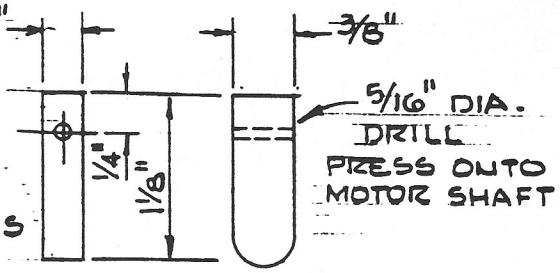


TOP VIEW

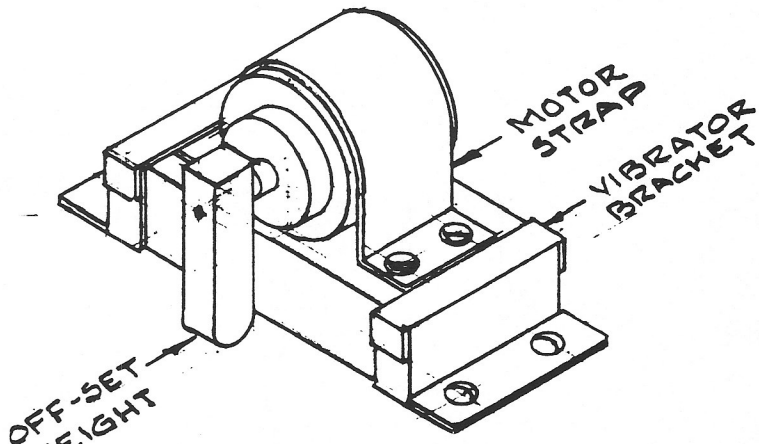


FRONT VIEW

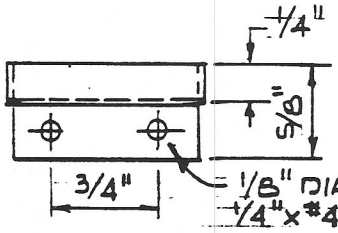
VIBRATOR MOTOR ASSEMBLY



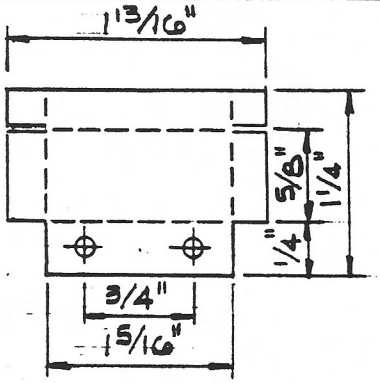
OFF-SET WEIGHT DETAIL



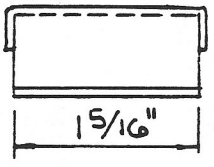
VIBRATOR ASS'Y WITH BRACKET



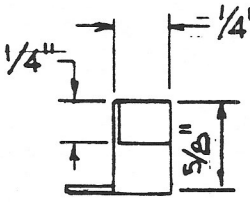
TOP VIEW



VIBRATOR BRACKET BEFORE FORMING



FRONT VIEW



SIDE VIEW

VIBRATOR BRACKET DETAIL
(2 REQ'D)

MATERIAL:

MOTOR STRAP AND VIBRATOR BRACKET: .027"-.030" ALUMINUM

OFF-SET WEIGHT: ¼" LEXAN (POLYCARBONATE).

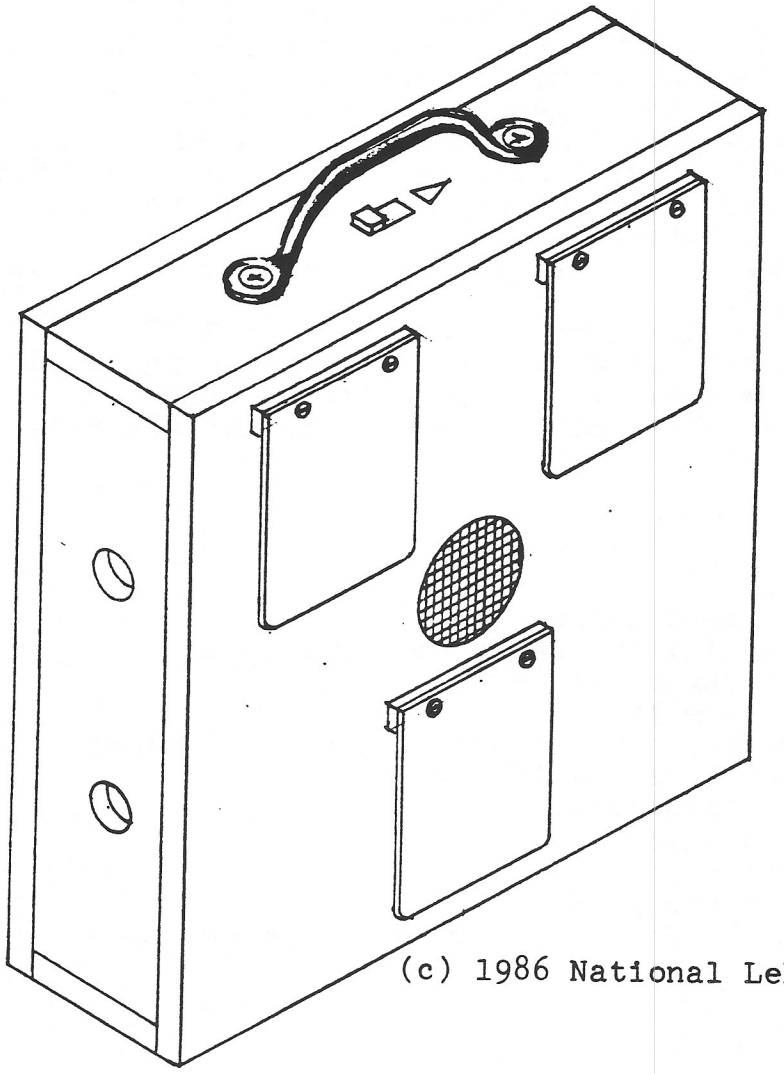
MOTOR - MABUCHI RE-56
JOHN J. MESHNA JR. INC.
19 ALLERTON ST.
LYNN, MA. 01904
CATALOG NO. SP-40
FALL 1985, PAGE 38
ITEM NO. H-56-19

BUSY BOX II

This Busy Box is smaller and a bit simpler than the Busy Box detailed in the first volume of the Lekotek Plan Book of Adaptive Toys. This Busy Box has several features that make it an excellent toy for a child with physical disabilities:

1. A light touch is all that is necessary to activate any of the three panels.
2. The box is relatively small, not very high and will enable a child who has difficulty extending his arms to reach any of the panels.
3. The bright color of each panel is different, giving the child an opportunity to choose by color as well as sound.

Each panel has a different sound. One beeps, one turns on a pre-set radio, and one activates a noisy vibration. There is an off-on switch under the carrying handle. The two "C" batteries are easily replaced by opening a plate on the side of the box.



(c) 1986 National Lekotek Center

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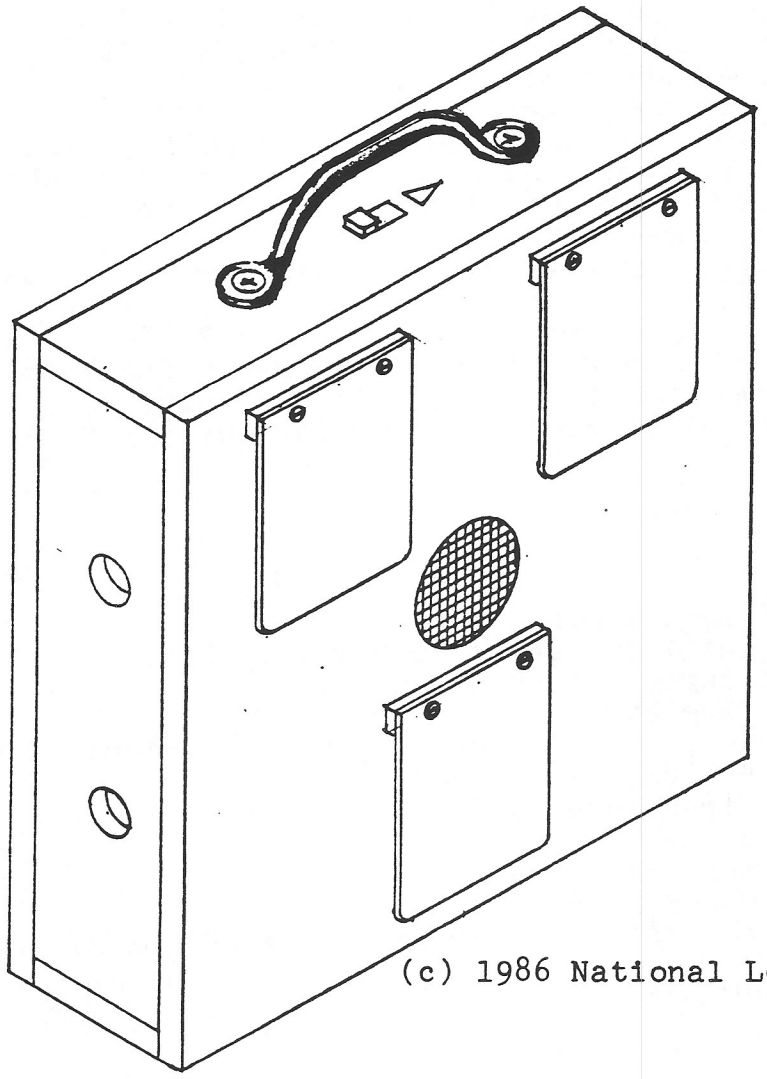


(c) 1986 National Lekotek Center

Materials needed:

- 3/8" birch plywood - refer to drawing on page 5
- Elmer's Carpenter's Glue
- Varathane gloss varnish or equal
- Wood screws, flat head, #4 x 3/4" and #4 x 1"
- One piece 3" x 3" aluminum screen wire, 16 mesh
- Hot melt glue
- One slide switch, Radio Shack #275-401 (off-on)
- Three Mini lever switches, Radio Shack #275-016
- One radio, Radio Shack #12-177
- One pulsating buzzer, Radio Shack #273-066
- One piece aluminum .027" - .030" for motor strap and vibrator bracket
- 1/4" Lexan (polycarbonate) for off-set weight
- Motor (See page 8 for ordering information.)
- 22 guage stranded wire, Radio Shack #278-1307
- Two "C" size flashlight batteries
- One Stanley door pull #CD479
- Three pieces 1/16" clear Lexan, 2 1/2" x 3"
- Three pieces 1/4" clear Lexan, 5/16" x 2 1/2"
- Superglue or equal
- One piece 22 guage stainless steel, 1 5/8" x 2 1/2"
- One machine screw, round head #6 x 3/4" w/2 hex nuts
- One pan head sheet metal screw #6 x 3/8"
- Six pan head sheet metal screws #4 x 3/4"
- Three pieces .027"-.030" aluminum sheeting cut to size for switch brackets. Source: aluminum gutter fabricator
- Two pieces same aluminum - scraps to hold radio and battery tube in place
- Six machine screws, #2-56 x 1/2" to mount switches to brackets
- 18 pan head sheet metal screws, #4 x 3/8"
- Four self-sticking cushion feet, Radio Shack #64-2346
- Spray enamel paint in red, white and blue
- One 1 1/4" PVC insert coupling for battery tube

Tools needed:

- Table saw
- Sander or sand paper
- Electric drill and selected twist drills
- Expansion auger bit or holesaw 1 1/2"
- Hot melt glue gun
- Metal shears, screwdrivers, hammer, straight edge
- Wood auger bits 5/16", 1/2"
- Soldering iron (small)
- Rosin core solder
- Wire cutters, pliers
- Flat and round files
- Square file 1/4" for rectangle hole OFF-ON switch

Construction suggestions:

Cut out the pieces of 3/8" plywood to the sizes detailed on page 5. Locate the holes for the switch buttons, the "nose" screen, the battery compartment in the side panel and the on-off switch in the top panel. Sand all the pieces and, except for the back panel, glue and nail the pieces together. Screw on the back panel. Sand the box overall and apply two coats of Varathane gloss varnish, sanding lightly between coats.

The front "eye" panels and the "mouth" panel are all really switch activators made of 1/16" Lexan. Bond the switch activators to the 1/4" x 5/16" x 2 1/2" Lexan strips (as shown on page 8), with Superglue. When the bonding is set, paint the underside of the activator with bright shades of red, white and blue. Painting the underside leaves the tops easy to clean and the paint is not rubbed off through continual use. Drill holes as shown on page 8 and mount the activators in place as detailed in the drawing on page 5, center.

Turn the box over, remove the back, and proceed with the inside assembly. First, lay the screen wire over the 1 1/2" "nose" hole on the inside and press the wire into the hole with the 3/4" pipe coupling until the screen wire is even with the front surface of the box. Trim off leaving about 3/8" inside and flatten this on the inside of the box. Fasten to the inside of the box with hot melt glue or tacks, then remove the coupling leaving a neat grill for the radio music and the pulsing buzzer.

Next, mount the off-on switch with the switch button protruding through the rectangular slot in the top of the box under where the handle will go.

Form the supports for the three lever switches, Radio Shack #275-016, as detailed in the top of page 8. Drill all indicated holes, mount the switches on brackets, then screw the brackets so the switch buttons protrude through the face panel under the activators as shown on page 5, center.

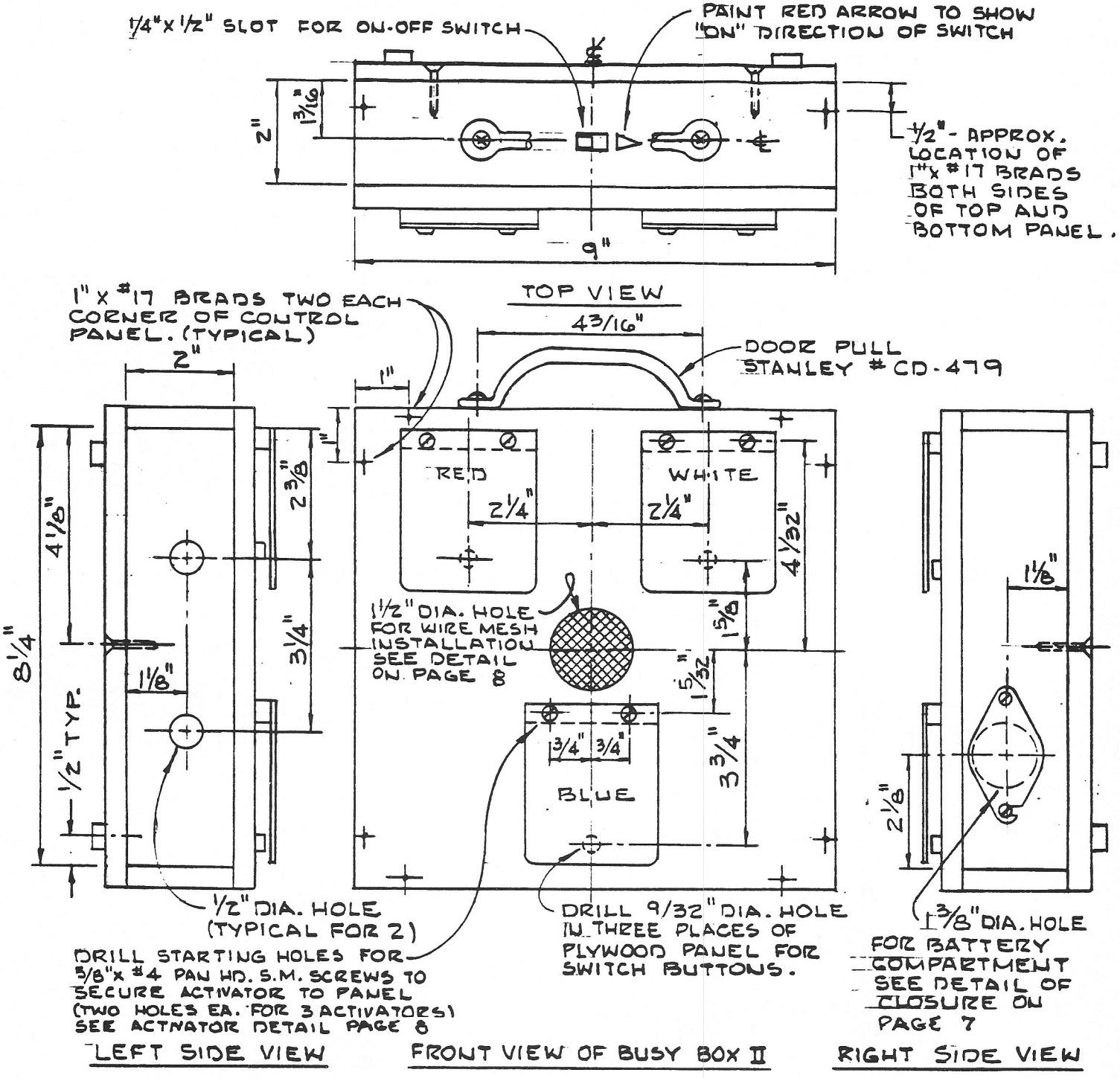
Mount the PVC coupling that is used for the battery compartment, as shown on page 7. Make and place the copper bracket at the end of the PVC coupling as shown on page 7. Best to solder a red wire onto the bracket before screwing down the copper bracket. Then, solder a black wire onto the bolt that is the pivot for the battery compartment closure (which is the outside sheet steel door to the battery compartment). The bolt with wire attached is shown in the lower left of the page 6 drawing. The wire goes to the switch at the top of the box under the handle. Locate the battery compartment closure as shown on the right side view of the box on page 5. Batteries go in with the tips pointing outward.

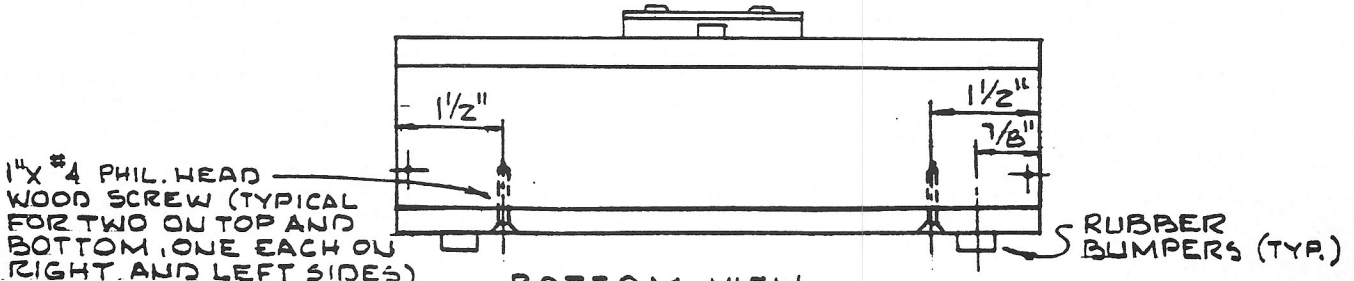
Make the vibrator assembly as detailed on page 8 and mount the assembly in the location shown on the page 6 drawing.

Snap open the radio and solder a red wire to the "+" terminal and a black wire to the "-" terminal. Keep the identity of these wires since the radio will not function if the polarity is reversed. The radio is to run on the "C" cells in the Busy Box II rather than the batteries in the radio. Make the two radio brackets, mounted on their 1/2" x 1/4" x 4 1/4" wood blocks, as detailed on the bottom of page 8 and install in the location detailed on page 6, item 4.

Connect wires as shown on page 6 and solder all connections after testing to be sure it works. Install the batteries.

Attach the four cushion feet to the back panel. This keeps any raised screw heads from marring the furniture the Busy Box II is placed on.

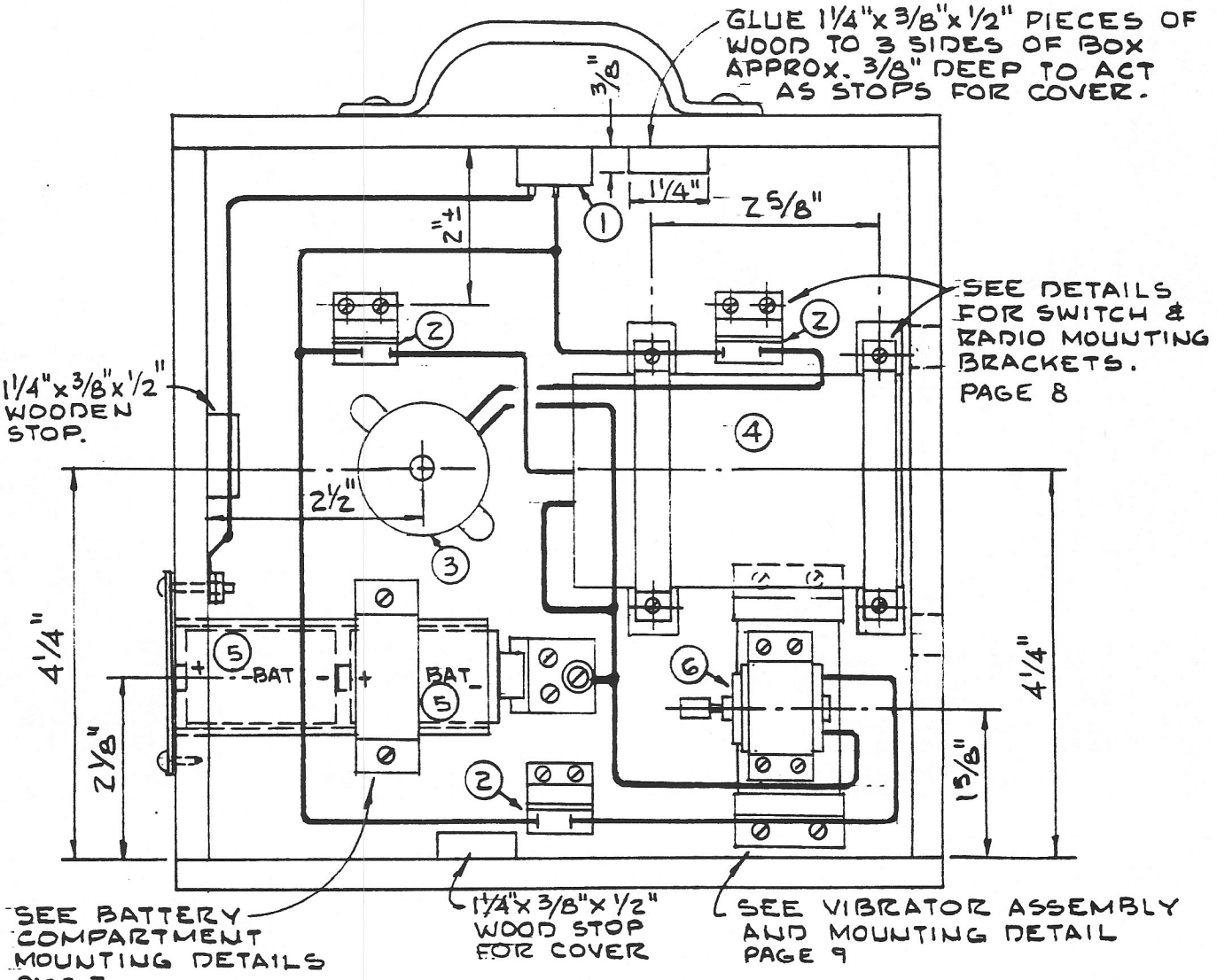

1/4"x1/2" SLOT FOR ON-OFF SWITCH
PAINT RED ARROW TO SHOW "ON" DIRECTION OF SWITCH
2"
1 3/16"
1/2" - APPROX. LOCATION OF 1"x #17 BRADS BOTH SIDES OF TOP AND BOTTOM PANEL.
9"
TOP VIEW
1" x #17 BRADS TWO EACH CORNER OF CONTROL PANEL. (TYPICAL)
43/16"
DOOR PULL STANLEY # CD-479
2"
1"
RED
WHITE
2 1/4"
2 1/4"
4 1/32"
2 3/8"
4 1/8"
8 1/4"
3 1/4"
1 1/8"
1/2" TYP.
1 1/2" DIA. HOLE FOR WIRE MESH INSTALLATION SEE DETAIL ON PAGE 8
1 5/8"
1 5/32"
3/4" 3/4"
BLUE
3 3/4"
1/2" DIA. HOLE (TYPICAL FOR 2)
DRILL STARTING HOLES FOR 5/8"x #4 PAN HD. S.M. SCREWS TO SECURE ACTIVATOR TO PANEL (TWO HOLES EA. FOR 3 ACTIVATORS) SEE ACTNATOR DETAIL PAGE 8
DRILL 9/32" DIA. HOLE IN THREE PLACES OF PLYWOOD PANEL FOR SWITCH BUTTONS.
1 1/8"
2 1/8"
1 3/8" DIA. HOLE FOR BATTERY COMPARTMENT SEE DETAIL OF CLOSURE ON PAGE 7
LEFT SIDE VIEW
FRONT VIEW OF BUSY BOX II
RIGHT SIDE VIEW


1 1/2"
1 1/2"
7/8"
1"x #4 PHIL. HEAD WOOD SCREW (TYPICAL FOR TWO ON TOP AND BOTTOM, ONE EACH ON RIGHT AND LEFT SIDES) DRILL 7/64" DIA. HOLES & COUNTERSINK FOR EACH LOCATION.
RUBBER BUMPERS (TYP.)
BOTTOM VIEW

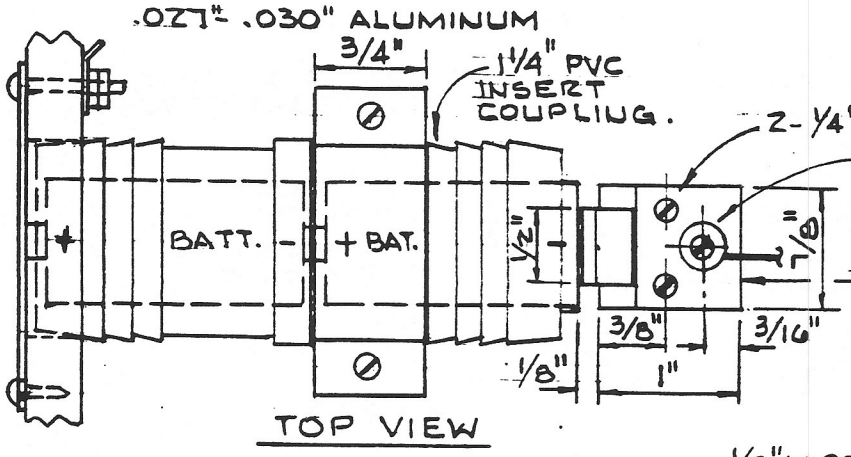
LIST OF NUMBERED COMPONENTS INSIDE BUSY BOX II (SEE WIRING DIAGRAM BELOW)

1. SLIDE SWITCH - SPST RADIO SHACK # 275-401
2. 3 LEVER SWITCHES - SPDT RADIO SHACK # 275-016
3. PULSATING BUZZER - RADIO SHACK # 273-066
4. RADIO - RADIO SHACK # 12-177
5. 2 "C" SIZE BATTERIES.
6. VIBRATOR MOTOR - MABUCHI RE-56 - JOHN J. MESHNA JR. INC. 19 ALLERTON ST. LYNN, MA. 01904 CATALOG NO. SP-40 FALL 1985 - PAGE 38 ITEM NO. H-56-19

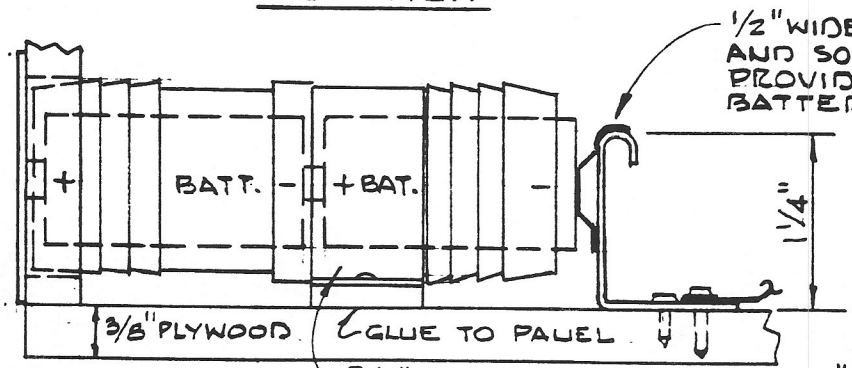
SEE DETAIL OF MOTOR MOUNTING & ASSEMBLY PAGE 9



WIRING DIAGRAM AND COMPONENT LAYOUT
VIEW OF BOX WITH BOTTOM COVER REMOVED

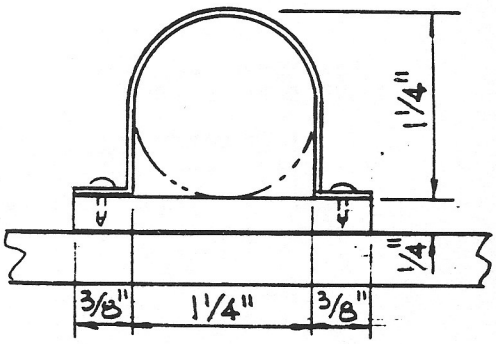

.027"-.030" ALUMINUM
3/4"
1 1/4" PVC INSERT COUPLING.
2-1/4"x#4 PAN HD. S.M. SCREW
3/8"x#4 PAN HD. S.M. SCREW WITH WASHER TO SECURE WIRE & BRACKET TO PLYWOOD PANEL.
20-22GA. COPPER BRACKET FORMED AS SHOWN & SECURED TO PLYWOOD PANEL W/3 SCREWS.
BATT. - + BAT.
1/2"
1 7/8"
3/8"
3/16"
1/8"
1"

TOP VIEW

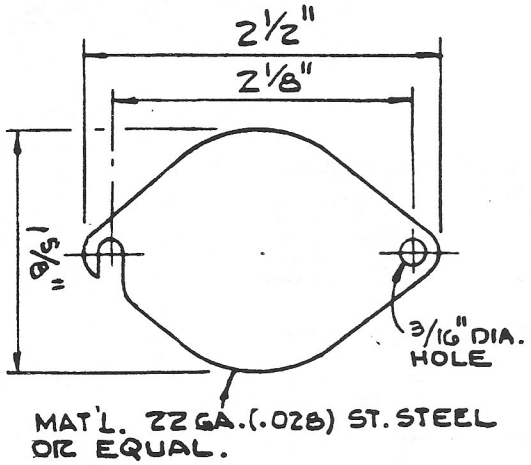

1/2" WIDE COPPER STRIP FORMED AND SOLDERED TO BRACKET TO PROVIDE SPRING SUPPORT TO BATTERY.
+ BATT. - + BAT. -
1 1/4"
3/8" PLYWOOD
GLUE TO PAUEL
3/4" WIDE BRACKET .027"-.030" ALUMINUM. MOUNTED ON 1/4" THK PLYWOOD. SEE DETAIL AT RIGHT.

FRONT VIEW

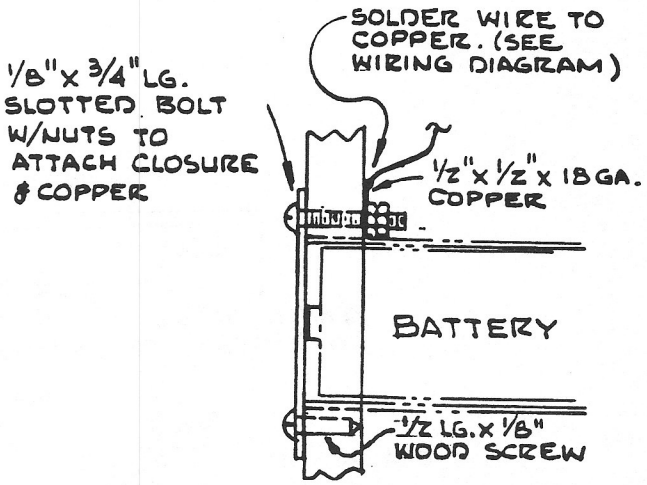
BATTERY COMPARTMENT MOUNTING DETAIL



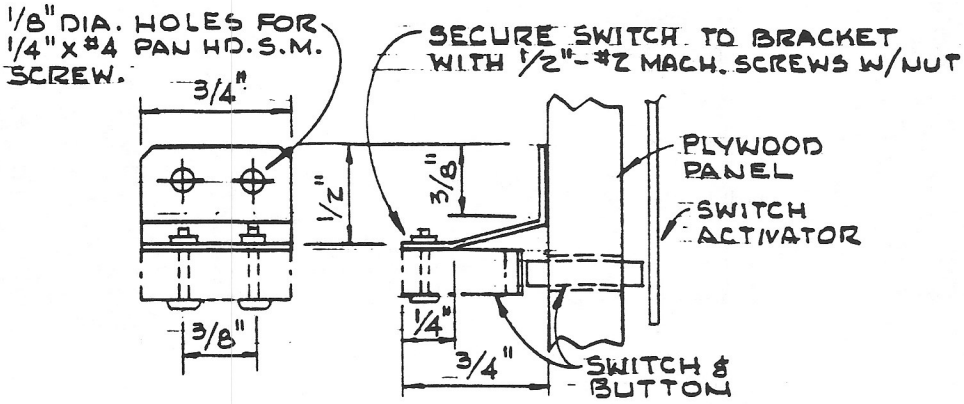
DETAIL OF BATTERY COMPARTMENT BRACKET



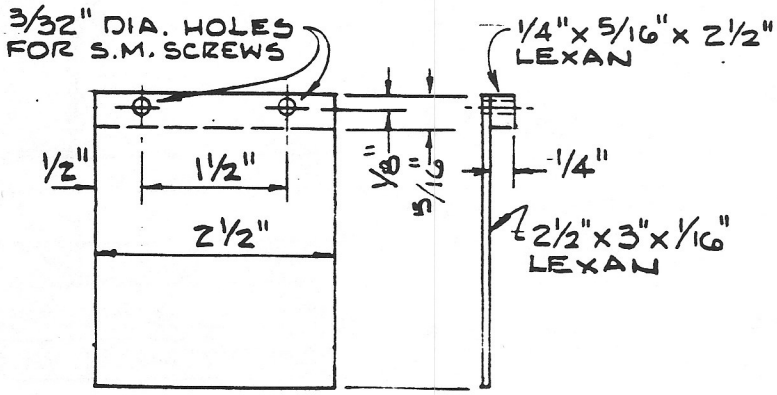
MAT'L. 22GA.(.028) ST. STEEL OR EQUAL.


1/8"x 3/4" LG. SLOTTED BOLT W/NUTS TO ATTACH CLOSURE & COPPER
SOLDER WIRE TO COPPER. (SEE WIRING DIAGRAM)
1/2"x 1/2"x 18GA. COPPER
BATTERY
1/2 LG. x 1/8" WOOD SCREW

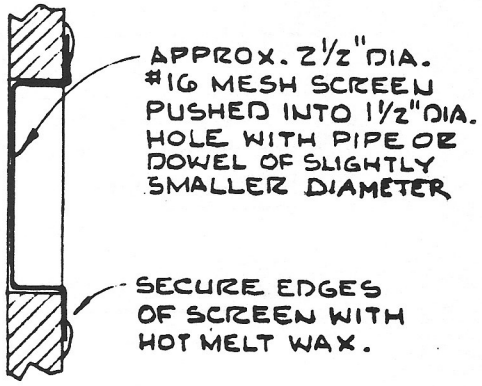
DETAIL AND INSTALLATION OF BATTERY COMPARTMENT CLOSURE



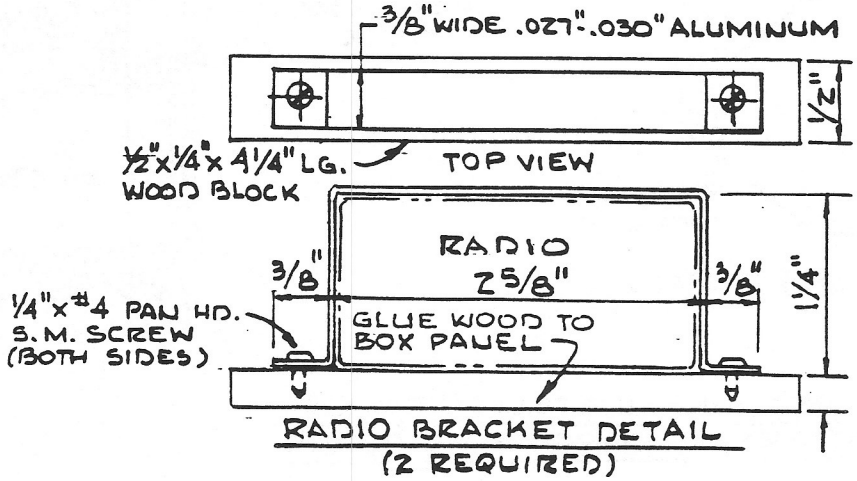
DETAIL OF SWITCH BRACKET



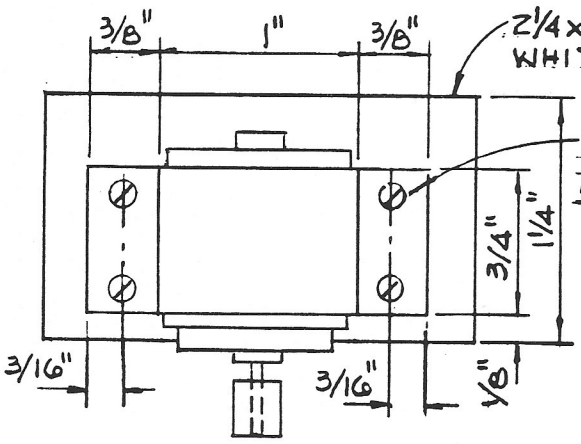
SWITCH ACTIVATOR DETAIL


APPROX. 2 1/2" DIA. #16 MESH SCREEN PUSHED INTO 1 1/2" DIA. HOLE WITH PIPE OR DOWEL OF SLIGHTLY SMALLER DIAMETER
SECURE EDGES OF SCREEN WITH HOT MELT WAX.

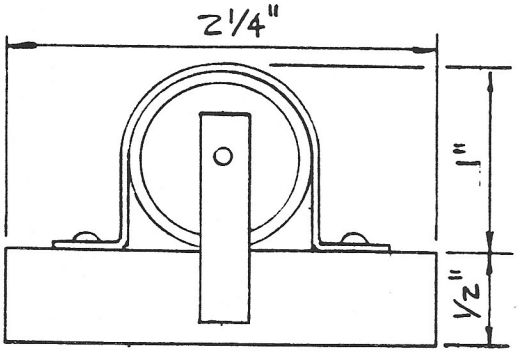
INSTALLATION DETAIL OF MESH SCREEN



RADIO BRACKET DETAIL
(2 REQUIRED)

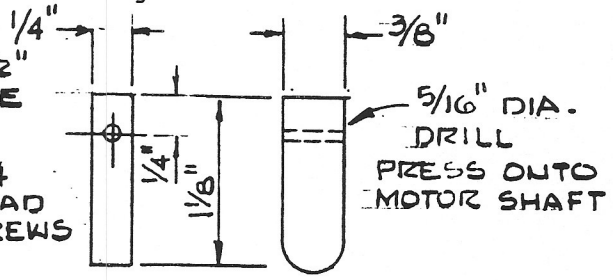


TOP VIEW

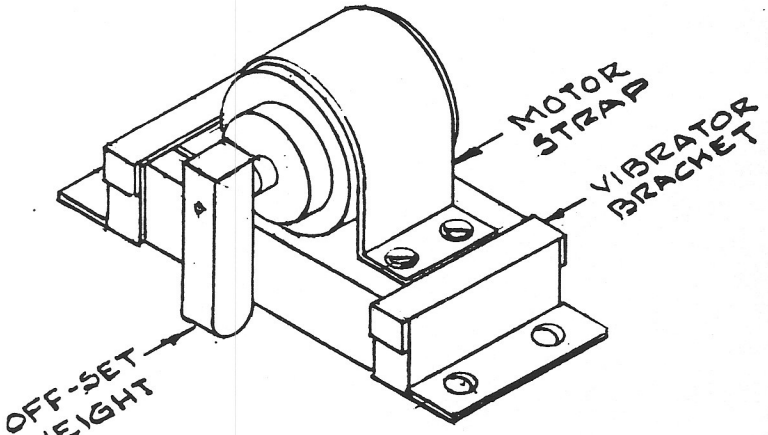


FRONT VIEW

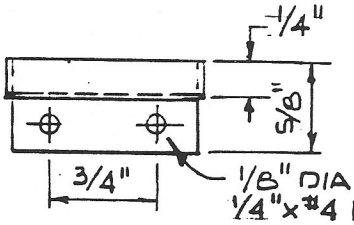
VIBRATOR MOTOR ASSEMBLY



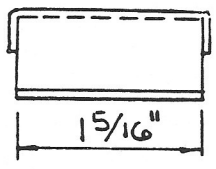
OFF-SET WEIGHT DETAIL



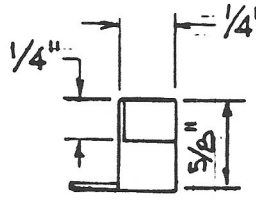
VIBRATOR ASS'Y WITH BRACKET



TOP VIEW

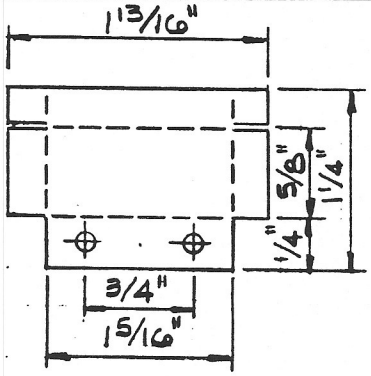


FRONT VIEW



SIDE VIEW

VIBRATOR BRACKET DETAIL
(2 REQ'D)



VIBRATOR BRACKET BEFORE FORMING

MATERIAL:

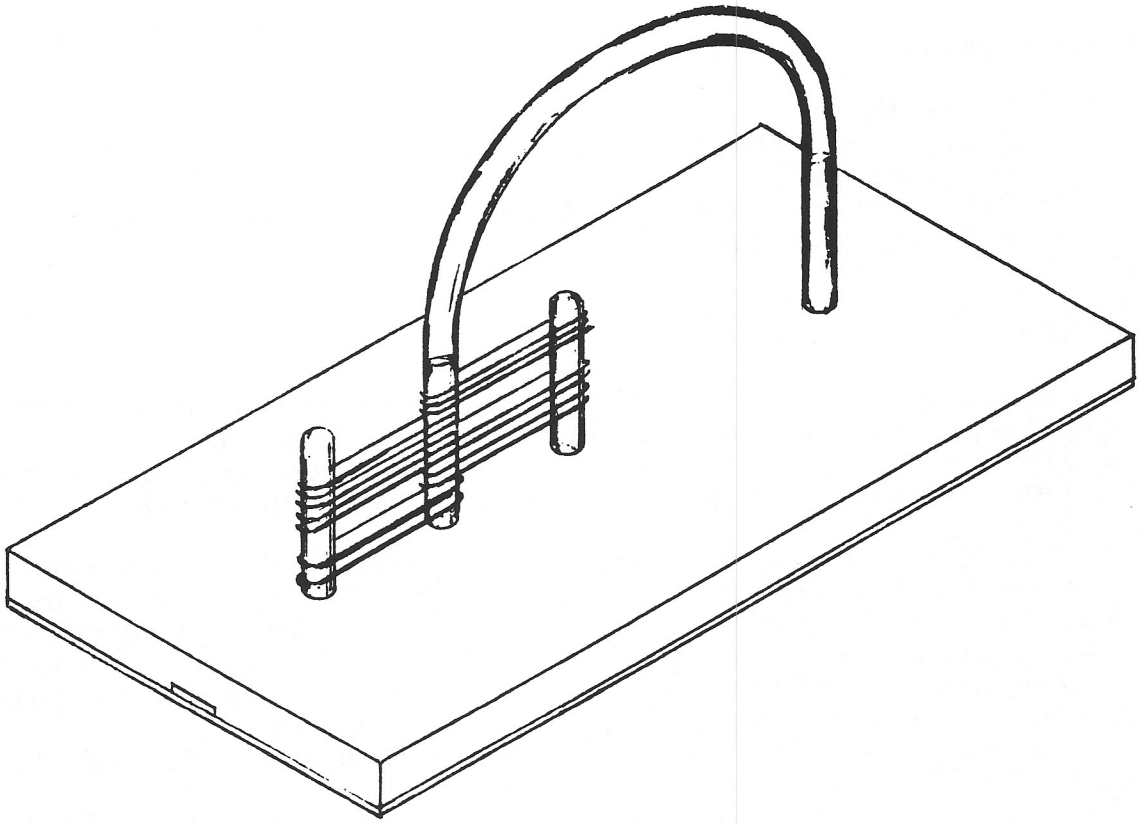
MOTOR STRAP AND VIBRATOR BRACKET: .027"-.030" ALUMINUM

OFF-SET WEIGHT: 1/4" LEXAN (POLYCARBONATE).

MOTOR - MABUCHI RE-56
JOHN J. MESHNA JR. INC.
19 ALLERTON ST.
LYNN, MA. 01904
CATALOG NO. SP-40
FALL 1985, PAGE 38
ITEM NO. H-56-19

STRETCHY BANDS

A dozen colored elastic bands for ponytails can be moved over a golden arch or stretched over pegs in many interesting combinations.



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Materials needed:

- A dozen "Braided elastic ponytail holders" from Goody brand #9885, or equal (from drug store or grocery)
- About 15 1/4" of 3/8" O.D. and 1/4" I.D. Tygon tubing
- Two 2 3/8" x 3/8" diameter dowels, rounded on one end
- Two 2 5/8" x 1/4" diameter dowels
- Varathane enamel in three bright colors
- 5/8" thick x 12" x 6" birch plywood
- 1/8" x 12" x 6" non-skid material
- Staples, Elmer's Carpenter's Glue

Tools needed:

- Table saw
- Drill press and a set of bits
- Stapling gun
- Paint brush (if spray cans are not used)
- Sandpaper, ruler, etc.

Construction suggestions:

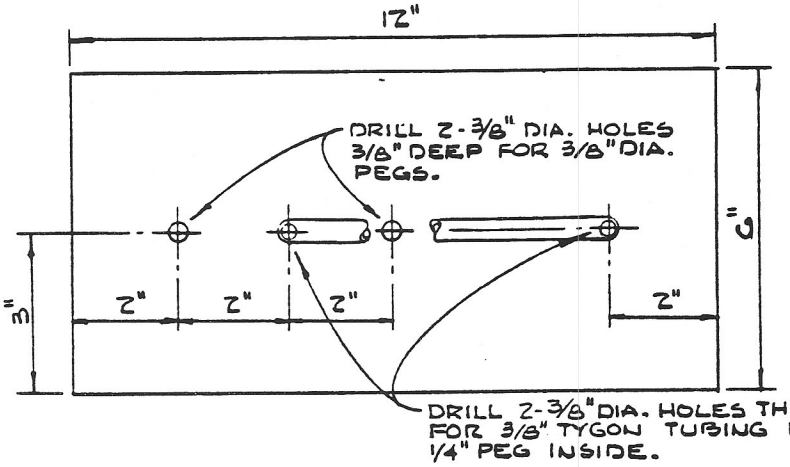
Cut the 12" x 6" x 5/8" plywood to size. Drill holes of size, location, and depth as noted on the drawing on page 3. Cut the 1/16" x 5/8" groove lengthwise of the base center. Note that the peg holes do not go all the way through while the tubing holes do.

Tygon tubing is recommended because it is "food grade" and safe for a child to put into her mouth. Cut the Tygon tubing to length and, holding one end up to the nozzle of a spray can of enamel, spray the inside of the tubing. This takes only a few seconds and transforms a plain piece of tubing into a colorful toy part. Hang the tubing up to dry for a day or so.

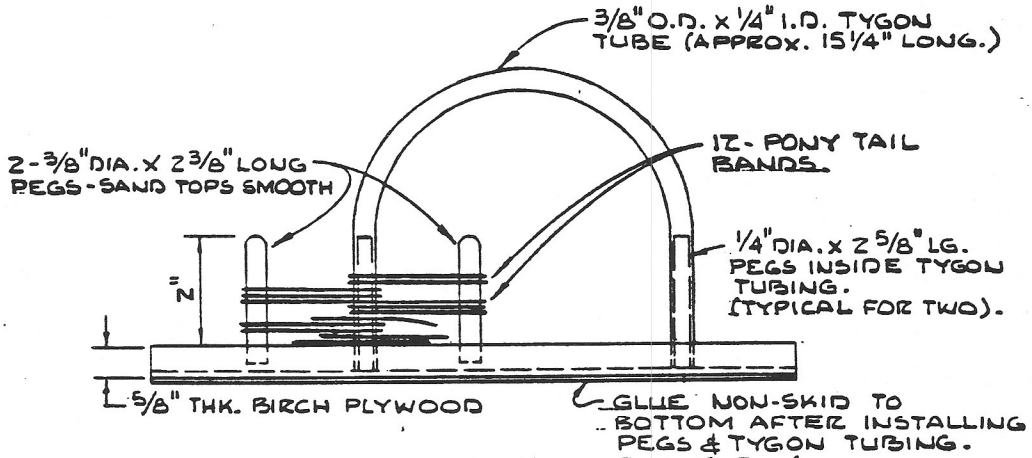
Paint the 12" x 6" x 5/8" plywood top and sides and the two 2 3/8" x 3/8" dowels with bright colors.

When everything is dry, glue the 3/8" dowels in place. Put the 12 ponytail bands over the tubing and put the ends of the tubing through their holes in the board. Slit the tubing ends 1/2" lengthwise and staple the split ends into the slot as shown in the drawing on page 3. Slide the 1/4" diameter x 2 5/8" long dowels up into the tubing and put a staple across the ends of the tube. This last dowel gives the tubing a needed rigidity.

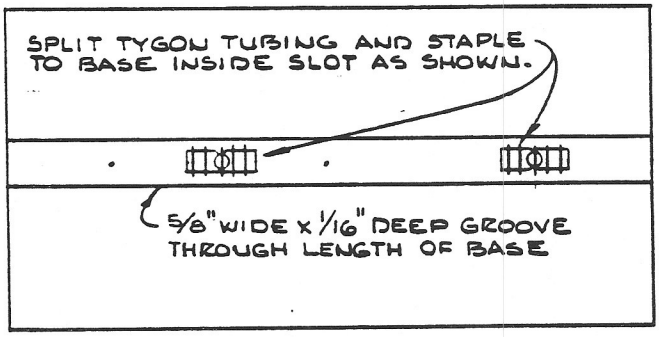
Cover the bottom with a non-skid material using double-sided tape or contact cement.



TOP VIEW


3/8" O.D. x 1/4" I.D. TYGON TUBE (APPROX. 15 1/4" LONG.)
2-3/8" DIA. X 2 3/8" LONG PEGS - SAND TOPS SMOOTH
12- PONY TAIL BANDS.
1/4" DIA. x 2 5/8" LG. PEGS INSIDE TYGON TUBING. (TYPICAL FOR TWO).
"N
5/8" THK. BIRCH PLYWOOD
GLUE NON-SKID TO BOTTOM AFTER INSTALLING PEGS & TYGON TUBING.

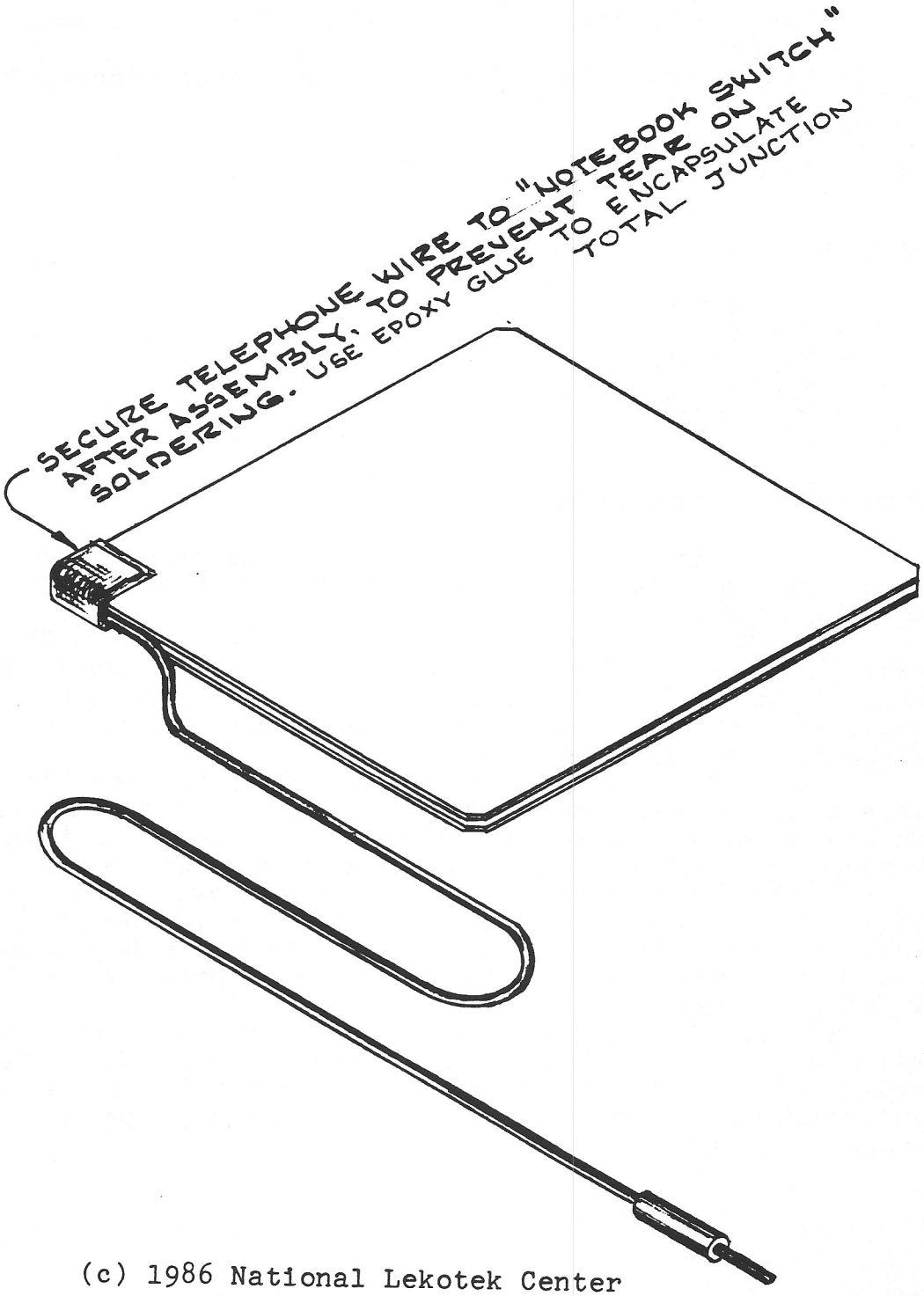
FRONT VIEW OF STRETCHY BANDS TOY



BOTTOM VIEW
(SHOWN WITHOUT NON-SKID)

NOTEBOOK SWITCH

Here is a "thinnest ever" switch that operates as well as any bigger or heavier switch can. This one is perfect for the child capable of only the lightest touch or body roll. It is also durable, reasonable in cost and not hard to make.


SECURE TELEPHONE WIRE TO "NOTEBOOK SWITCH" AFTER ASSEMBLY. TO PREVENT TEAR ON SOLDERING. USE EPOXY GLUE TO ENCAPSULATE TOTAL JUNCTION

(c) 1986 National Lekotek Center

Materials needed:

- One K-M (Kingsbacher-Murphy Co) T-2311-05-D snap ring plastic notebook binder. This has a single layer flexible plastic cover.
- Telephone cable, Radio Shack #278-365, about 6'
- Plug, Radio Shack #274-286
- Two pieces 6" x 5 5/8" x .003" thick brass shim stock
- Solder
- Double-sided adhesive foam tape, nine pieces, Radio Shack #64-2343
- Epoxy cement
- Double-sided "Scotch" tape

Tools needed:

- Scissors
- Knife
- Wire cutter
- Soldering iron
- Pliers, ruler, etc.

Construction suggestions:

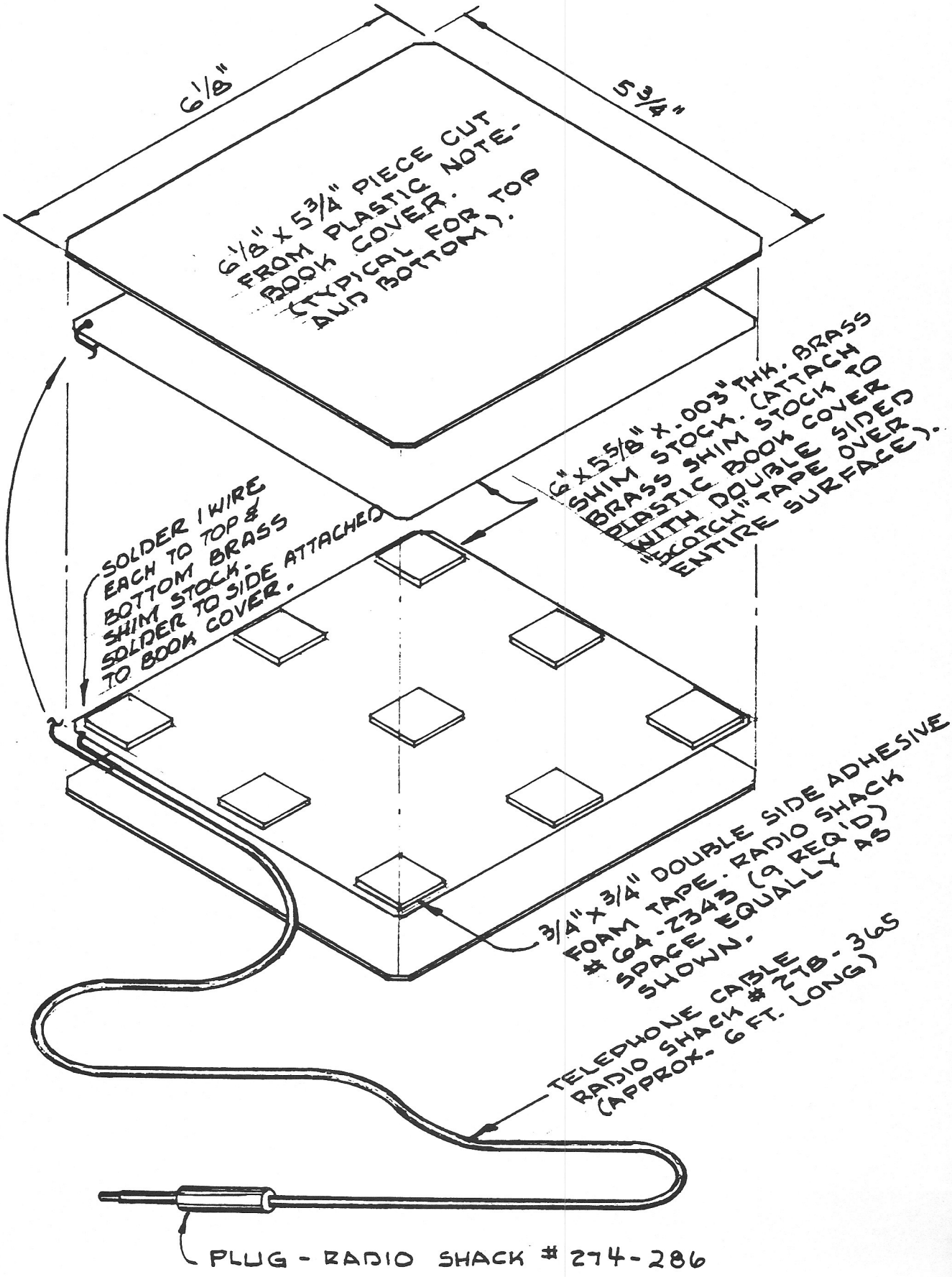
Cut the back and front from the snap ring binder. Cut each back and each front into two pieces 6 1/8" x 5 3/4". Nip 1/8" off the corners.

Cut the shim stock to make two pieces 6" x 5 5/8" for each switch. Cut a 6' length of telephone cable and stip back the insulation 1/2" on one end and 1" on the other end. Twist the black and red wires together on each end and the green and yellow wires together also on each end.

Solder one pair of wires to a corner of one of the pieces of shim stock. Solder the other pair of wires to a similar corner on the other piece of shim stock. The soldered joint is to be between the shim stock and the corner in each case.

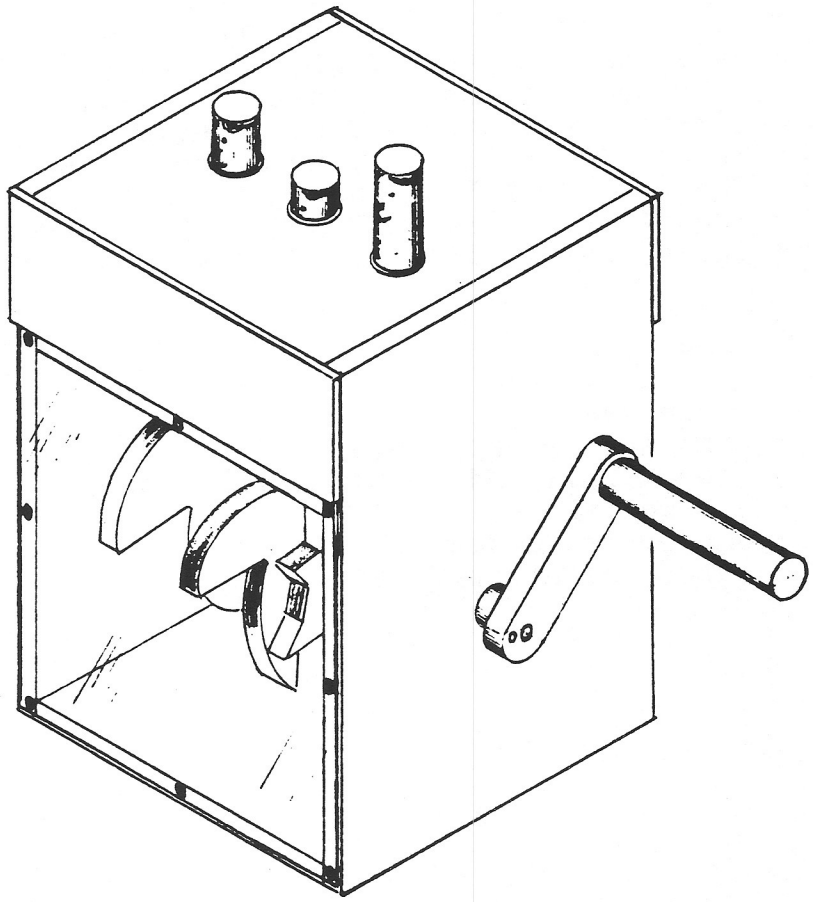
Fasten the shim stock to the cover, top and bottom, with double-sided tape. Place the nine pieces of 3/4" x 3/4" double-sided adhesive foam tape between the top shim-and-cover piece and the bottom shim-and-cover piece, as shown in the drawing on page 3.

Mix up about a teaspoonful of epoxy and, making sure the wires are not touching, spread the epoxy mix liberally over the soldered joint and the covers so the whole corner is encapsulated. Put aside to set so the epoxy does not "run" into unwanted areas.


6 1/8"
5 3/4"
6 1/8" X 5 3/4" PIECE CUT FROM PLASTIC BOOK COVER. NOTE- (TYPICAL FOR TOP AND BOTTOM).
6" X 5 5/8" X .003" THK. BRASS SHIM STOCK. (ATTACH BRASS SHIM STOCK TO PLASTIC BOOK COVER WITH DOUBLE SIDED "SCOTCH" TAPE OVER ENTIRE SURFACE).
SOLDER 1 WIRE EACH TO TOP & BOTTOM BRASS SHIM STOCK. SOLDER TO SIDE ATTACHED TO BOOK COVER.
3/4" X 3/4" DOUBLE SIDE ADHESIVE FOAM TAPE - RADIO SHACK # 64-2343 (9 REQ'D) SPACE EQUALLY AS SHOWN.
TELEPHONE CABLE RADIO SHACK # 278-365 (APPROX- 6 FT. LONG)
PLUG - RADIO SHACK # 274-286

CRANK BOX

It is quite easy to turn the oversized handle on this box which causes little men to move up and down. A see-through front enables the child to look inside the box. Some children may find it difficult to rotate their wrists to turn the crank.



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Materials needed:

- One 8" x 2' piece of 3/8" thick birch plywood
- 24" of 3/4" diameter dowel
- Two pieces 7 5/8" x 8 1/4" x .080" thick clear acrylic plastic sheet (safety-glazing)
- Eight 1/2" x #4 pan head sheet metal screws
- Three 1" x #6 regular slotted wood screws
- One 3/4" x #4 regular slotted wood screws
- Three 1/2" x #4 regular slotted wood screws
- One piece 7 3/4" x 7 1/2" non-skid material
- One piece 4" long x 1/2" diameter dowel
- About 30 - 3/4" long x #17 brads
- One 8 1/2" x 11" sheet carbon paper
- Varathane, or equal, gloss varnish
- Varathane, or equal, enamel in red, green, yellow and blue
- Elmer's Carpenter's Glue or equal
- Three 1/2" x #14 flat head wood screws
- Three 1" x #6 Phillips head tapping screws
- Two pieces 7 3/4" x 2 5/8" x 1/8" birch plywood
- Three discs 1 1/4" diameter x 1/8" birch plywood

Tools needed:

- Table saw
- Band saw or saber saw
- Power drill and set of drill bits
- Screwdriver
- Sander or sandpaper
- Ruler, paintbrush, etc.

Construction suggestions:

Cut three 7" discs of 3/8" birch plywood. Using carbon paper and the drawing on page 4, trace the outline of each of the three cams on a disc. Saw out the cams using a band saw or a saber saw. Drill the center 3/4" diameter hole in each cam. Drill a 1/8" hole and countersink hole in each cam as shown on the page 4 drawing.

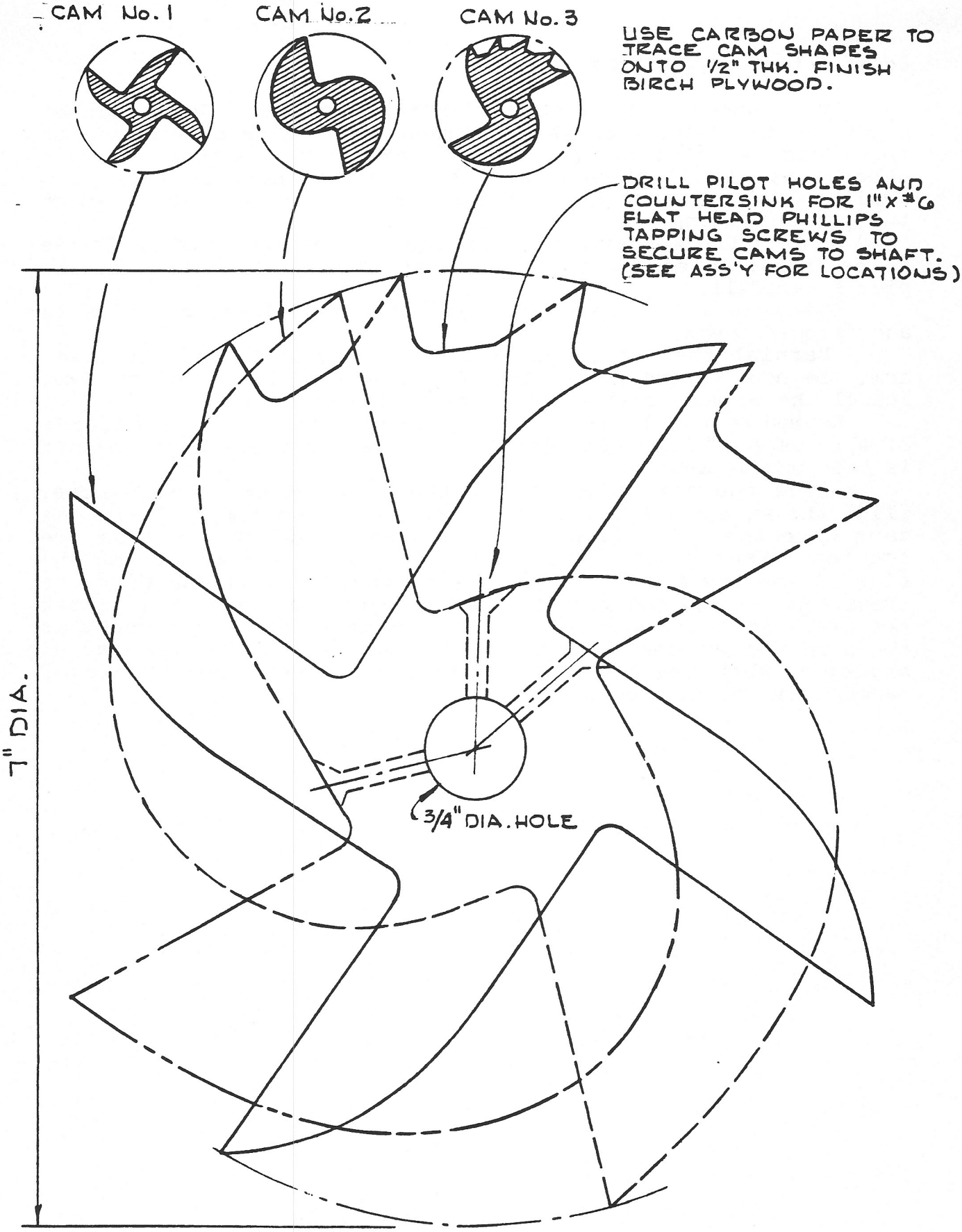
Cut out the wooden pieces for the box and mark and drill the holes in each piece as detailed on pages 5 and 6. Sand all the pieces carefully.

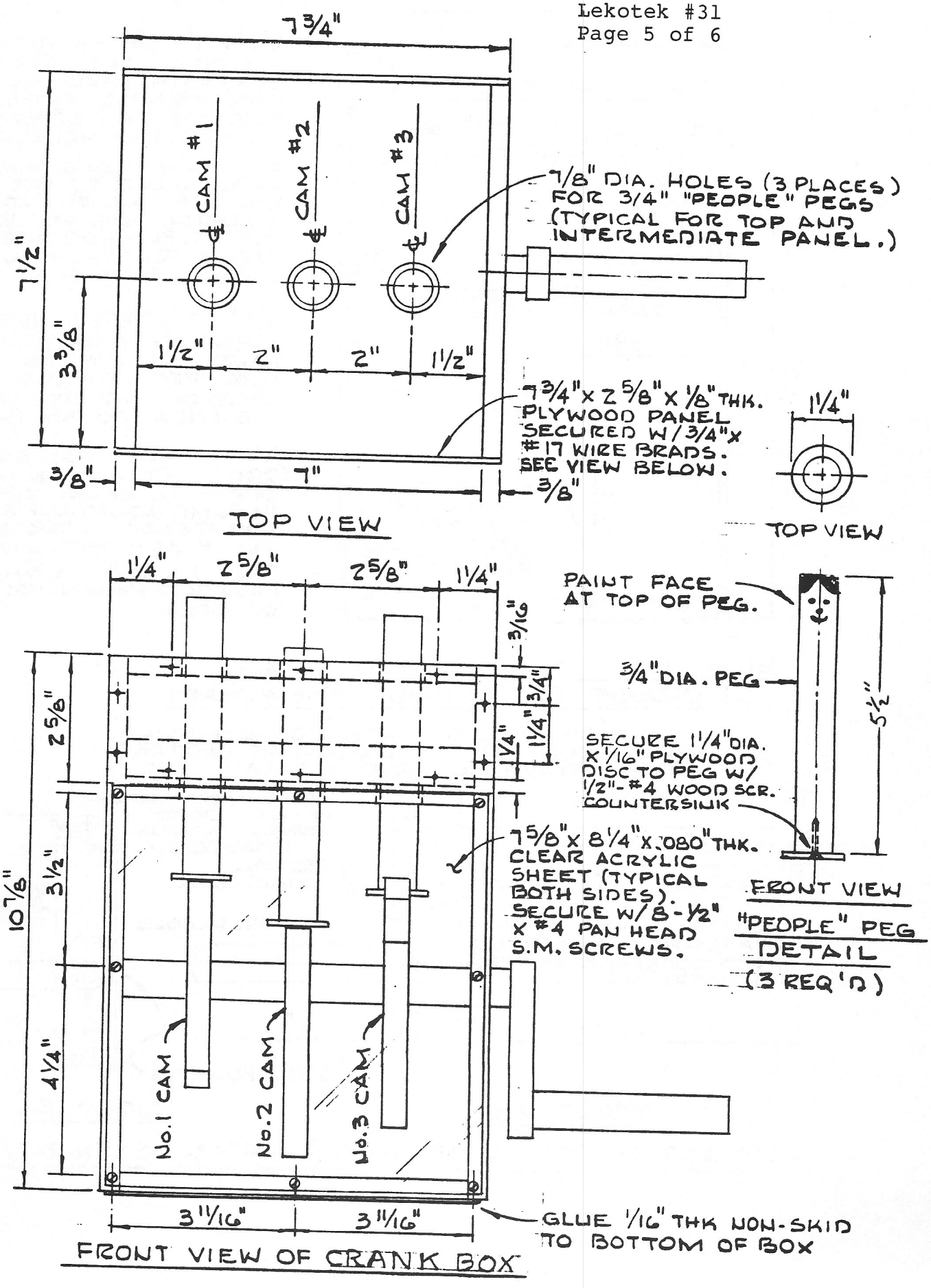
Assemble all the wooden pieces of the box except the axle and "people" pegs.

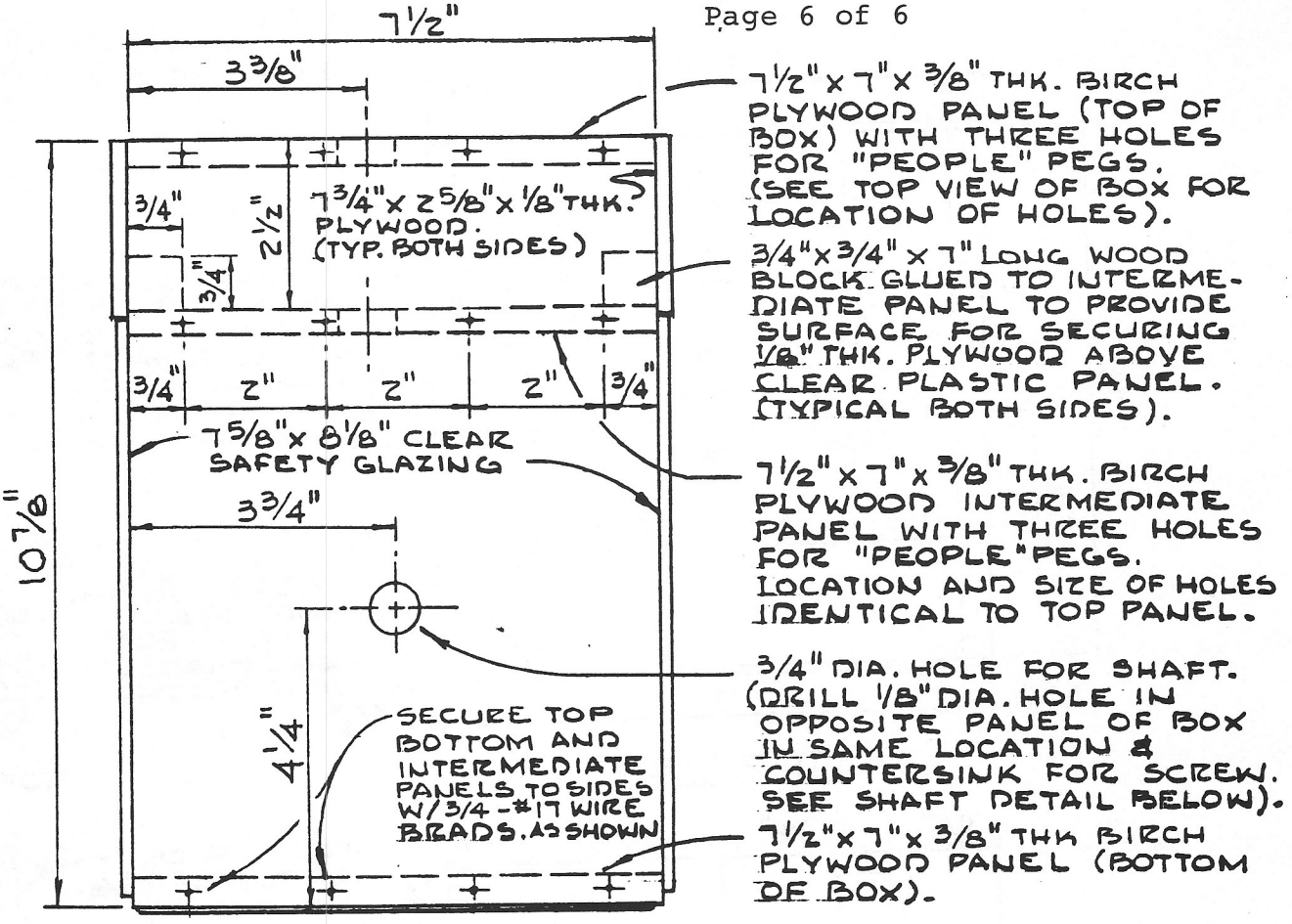
Varnish the cams, the axle, the "people" pegs, the crank arm, the handle, and the inside of the bottom portion of the box. Enamel the outside either green, blue, red or yellow.

Assemble the 1 1/4" x 1/8" plywood discs to the bottoms of the "people" pegs and insert into the box holes when the box is held upside down.

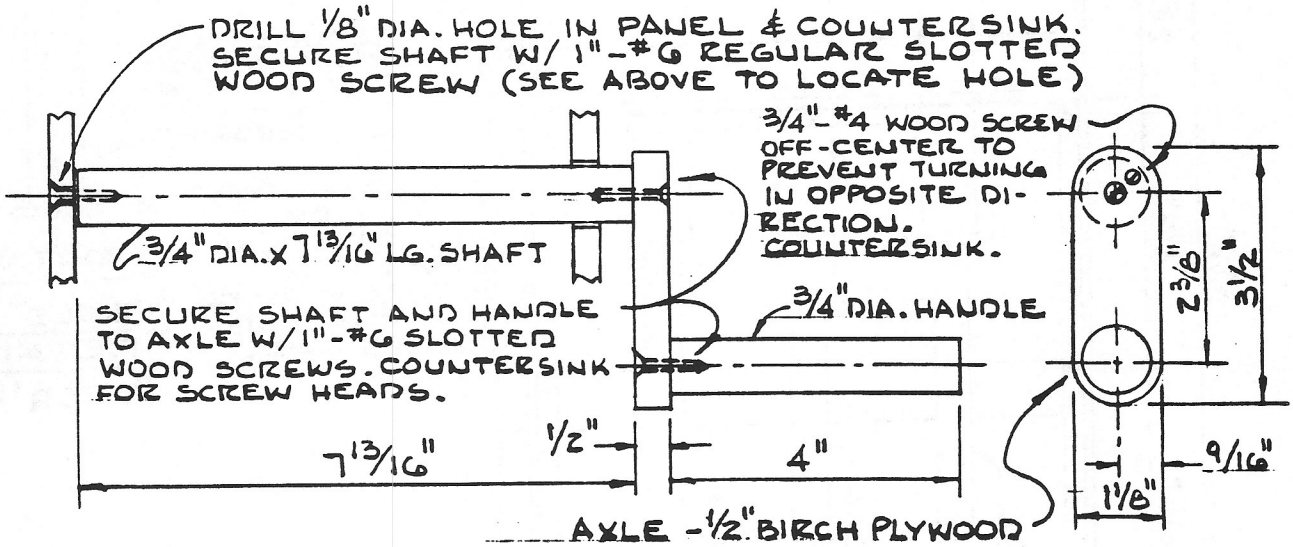
Slide the cam axle through the box side and, one by one, slide the axle through the center holes in the cams. Screw the cams onto the axles (a pilot hole here helps) so the cams are located directly below the "people." Drive a screw through the side of the box and into the axle on the opposite end from the crank arm. Screw and glue the handle onto the crank arm. Screw the crank arm with the handle onto the axle using two screws as shown in the drawing on page 6. The "people" should now move up and down when the crank is turned. Screw the two pieces of safety-glazing in place.


CAM No. 1
CAM No. 2
CAM No. 3
USE CARBON PAPER TO TRACE CAM SHAPES ONTO 1/2" THK. FINISH BIRCH PLYWOOD.
DRILL PILOT HOLES AND COUNTERSINK FOR 1" X #6 FLAT HEAD PHILLIPS TAPPING SCREWS TO SECURE CAMS TO SHAFT. (SEE ASS'Y FOR LOCATIONS)
7" DIA.
3/4" DIA. HOLE


7 3/4"
7 1/2"
3 3/8"
CAM #1
CAM #2
CAM #3
1 1/2"
2"
2"
1 1/2"
3/8"
7"
3/8"
7/8" DIA. HOLES (3 PLACES) FOR 3/4" "PEOPLE" PEGS (TYPICAL FOR TOP AND INTERMEDIATE PANEL.)
7 3/4" X 2 5/8" X 1/8" THK. PLYWOOD PANEL SECURED W/ 3/4" X #17 WIRE BRADS. SEE VIEW BELOW.
TOP VIEW
1 1/4"
TOP VIEW
1 1/4"
2 5/8"
2 5/8"
1 1/4"
3/16"
3/4"
1 1/4"
2 5/8"
10 7/8"
3 1/2"
4 1/4"
No.1 CAM
No.2 CAM
No.3 CAM
3 11/16"
3 11/16"
FRONT VIEW OF CRANK BOX
PAINT FACE AT TOP OF PEG.
3/4" DIA. PEG
5 1/2"
SECURE 1 1/4" DIA. X 1/16" PLYWOOD DISC TO PEG W/ 1/2" - #4 WOOD SCR. COUNTERSINK
7 5/8" X 8 1/4" X .080" THK. CLEAR ACRYLIC SHEET (TYPICAL BOTH SIDES). SECURE W/ 8 - 1/2" X #4 PAN HEAD S.M. SCREWS.
FRONT VIEW
"PEOPLE" PEG DETAIL
(3 REQ'D)
GLUE 1/16" THK NON-SKID TO BOTTOM OF BOX


7 1/2"
3 3/8"
10 7/8"
3/4"
2 1/2"
7 3/4" x 2 5/8" x 1/8" THK. PLYWOOD. (TYP. BOTH SIDES)
3/4"
2"
2"
2"
3/4"
7 5/8" x 8 1/8" CLEAR SAFETY GLAZING
3 3/4"
4 1/4"
SECURE TOP BOTTOM AND INTERMEDIATE PANELS TO SIDES W/ 3/4 - #17 WIRE BRADS. AS SHOWN
7 1/2" x 7" x 3/8" THK. BIRCH PLYWOOD PANEL (TOP OF BOX) WITH THREE HOLES FOR "PEOPLE" PEGS. (SEE TOP VIEW OF BOX FOR LOCATION OF HOLES).
3/4" x 3/4" x 7" LONG WOOD BLOCK GLUED TO INTERMEDIATE PANEL TO PROVIDE SURFACE FOR SECURING 1/8" THK. PLYWOOD ABOVE CLEAR PLASTIC PANEL. (TYPICAL BOTH SIDES).
7 1/2" x 7" x 3/8" THK. BIRCH PLYWOOD INTERMEDIATE PANEL WITH THREE HOLES FOR "PEOPLE" PEGS. LOCATION AND SIZE OF HOLES IDENTICAL TO TOP PANEL.
3/4" DIA. HOLE FOR SHAFT. (DRILL 1/8" DIA. HOLE IN OPPOSITE PANEL OF BOX IN SAME LOCATION & COUNTERSINK FOR SCREW. SEE SHAFT DETAIL BELOW).
7 1/2" x 7" x 3/8" THK BIRCH PLYWOOD PANEL (BOTTOM OF BOX).

SIDE VIEW & CONSTRUCTION DETAIL OF CRANK BOX WITHOUT PEGS & SHAFT

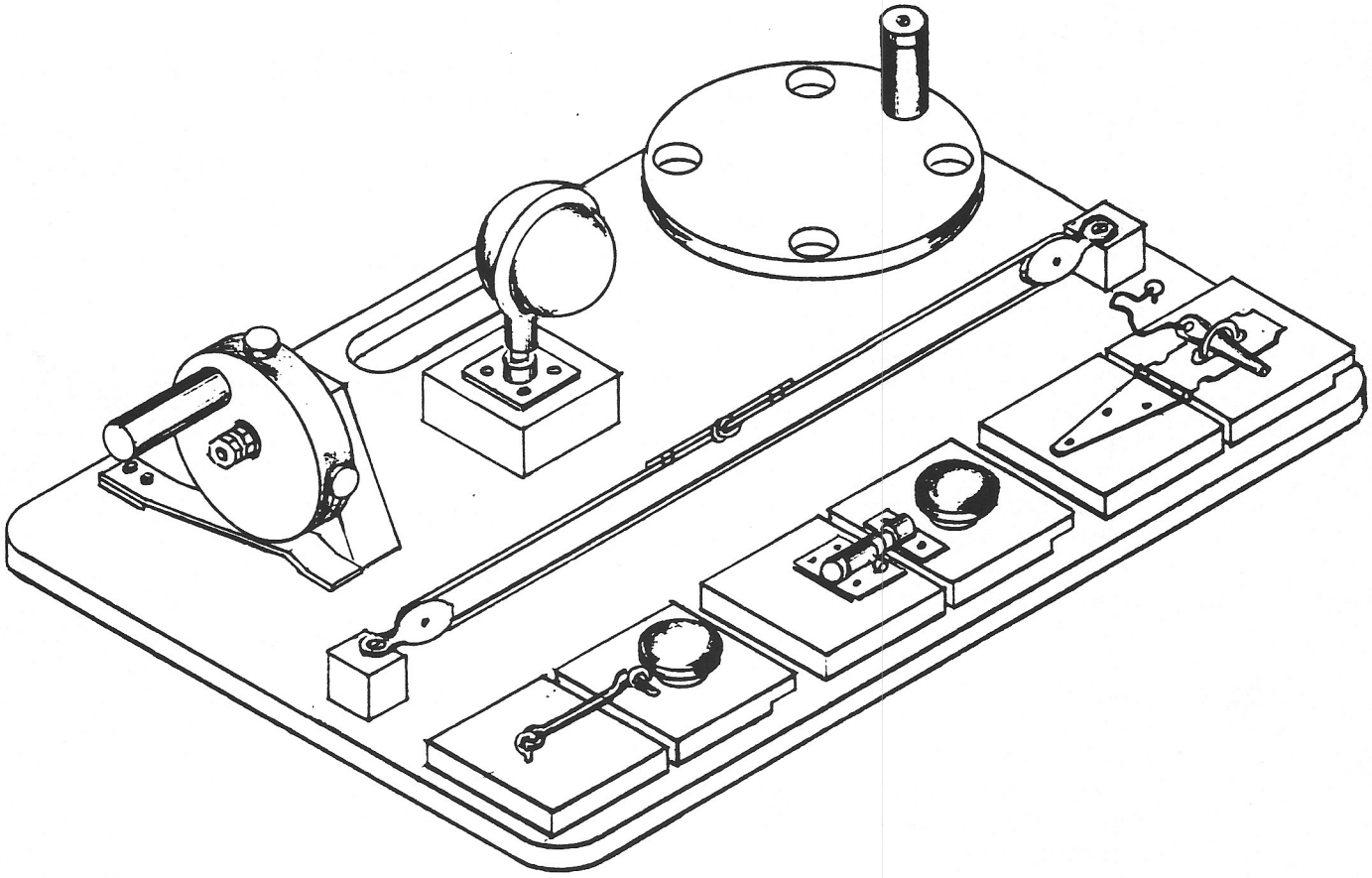

DRILL 1/8" DIA. HOLE IN PANEL & COUNTERSINK. SECURE SHAFT W/ 1" - #6 REGULAR SLOTTED WOOD SCREW (SEE ABOVE TO LOCATE HOLE)
3/4" - #4 WOOD SCREW OFF-CENTER TO PREVENT TURNING IN OPPOSITE DIRECTION. COUNTERSINK.
3/4" DIA. x 7 13/16" LG. SHAFT
3/4" DIA. HANDLE
SECURE SHAFT AND HANDLE TO AXLE W/ 1" - #6 SLOTTED WOOD SCREWS. COUNTERSINK FOR SCREW HEADS.
7 13/16"
1/2"
4"
2 3/8"
3 1/2"
9/16"
1 1/8"
AXLE - 1/2" BIRCH PLYWOOD

FRONT VIEW SIDE VIEW

INSTALLATION DETAIL OF SHAFT & HANDLE ASSEMBLY

MECHANICAL BOARD

The many mechanical objects that a child finds in his world may confuse, baffle and sometimes frustrate him. Several mechanical devices have been installed on this board to permit investigation, experimentation and play that can lead to understanding and mastery.



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Materials needed:

- One piece 20" x 14" x 1/2" birch plywood
- One piece 6" x 6" x 1/2" birch plywood
- Six pieces 3" x 3" x 1/2" birch plywood
- Two pieces 2 1/2" x 2 1/2" x 1/2" birch plywood
- Four pieces 1" x 1" x 1/2" birch plywood
- Two pieces 3 1/2" x 3 1/2" x 1/2" birch plywood
- One piece 4" x 4" x 3/4" birch plywood
- One piece 2 5/8" long x 5/8" diameter dowel
- Four pieces 3/8" long x 3/8" dowel or screwhole plugs
- One piece 3/4" wide aluminum strapping
- One piece 1 1/2" long x 7/10" diameter dowel
- One piece 1 3/8" long x 5/8" diameter O.D. PVC pipe
- One 4" x 4" "Lazy Susan" from Triangle Mfg. Co.
- One 2 1/2" diameter ball caster
- Two aluminum pulleys with 5/8" diameter x 1/4" wide pulley wheel
- Two 1 1/2" diameter wood knobs
- Three 1 1/2" long x 7/8" (open width) brass hinges
- One 3" long hinge hasp
- One 2" window bolt
- One 3" hook and eye
- Three self-adhesive "Fluffy Animal Stickers" from Hallmark Card manufacturer, or similar
- Three feet of 1/4" sash cord
- Elmer's Carpenter's Glue
- Varathane enamel (red and blue) or equal
- Varathane gloss varnish or equal
- One piece 20" x 14" non-skid material
- Contact cement

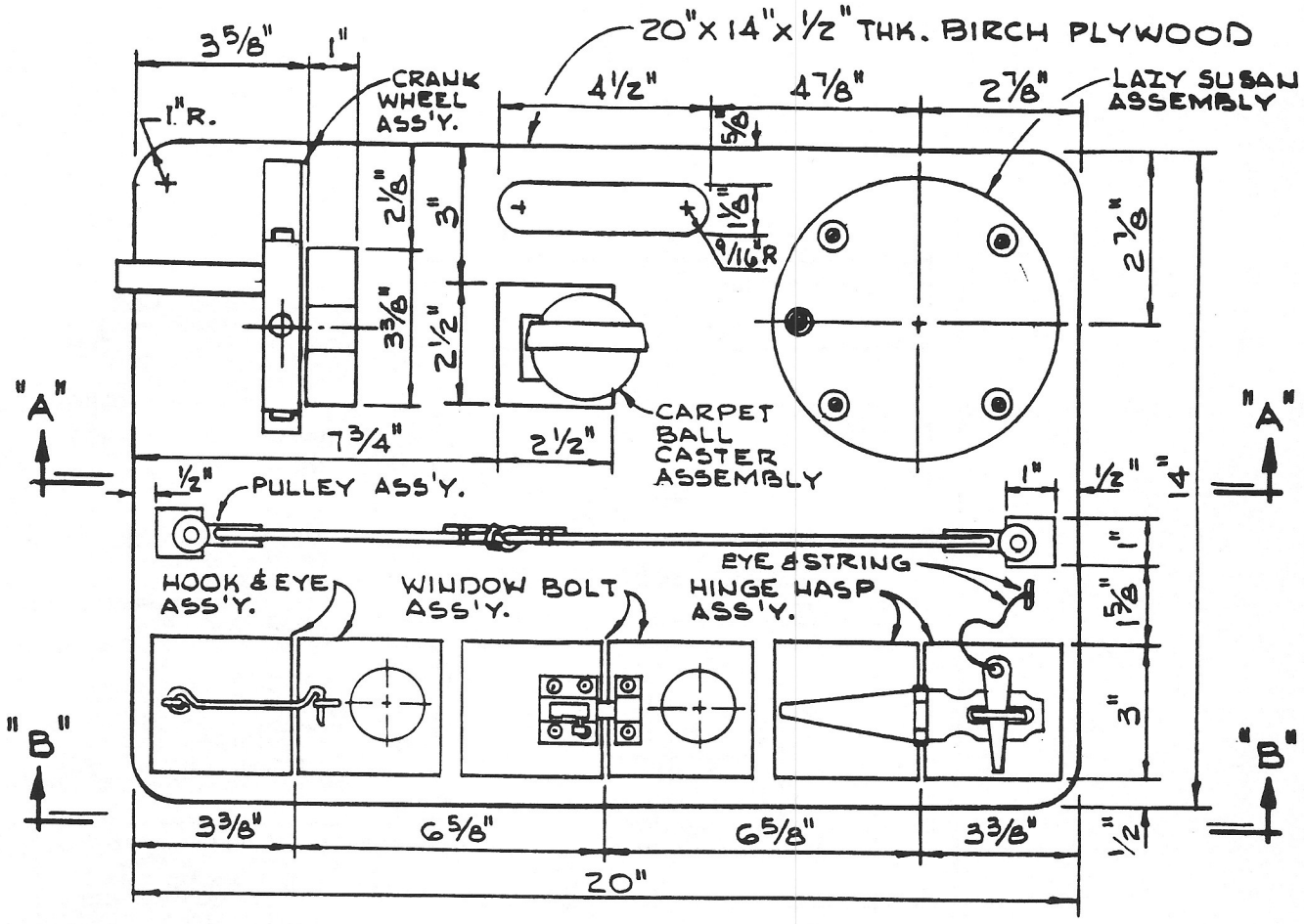
Tools needed:

- Table saw
- Saber saw with fine-tooth blade
- Power drill and set of drill bits
- Screwdriver
- Sander or sandpaper
- Paint and varnish brushes

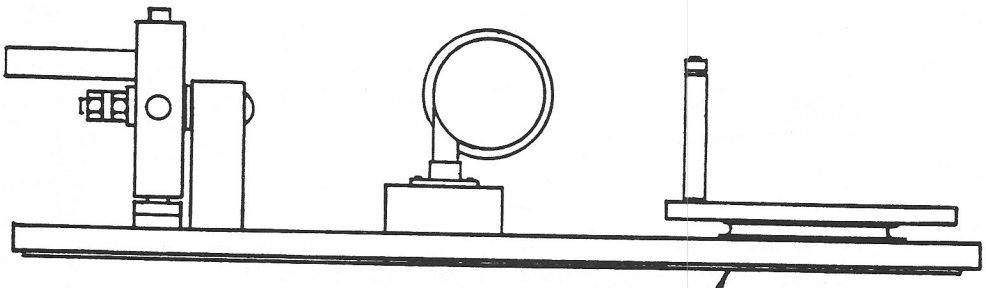
Construction suggestions:

Cut out the 20" x 14" board. Mark the 4 1/2" x 1 1/8" handle hole and the corner curves, and cut hole and curves with the saber saw. Sand carefully overall.

Cut out other plywood and wooden pieces. Following the detailed drawings on the next four pages, cut, paint and assemble. After the final varnishing, glue the animal stickers to the base board under each hinged panel.

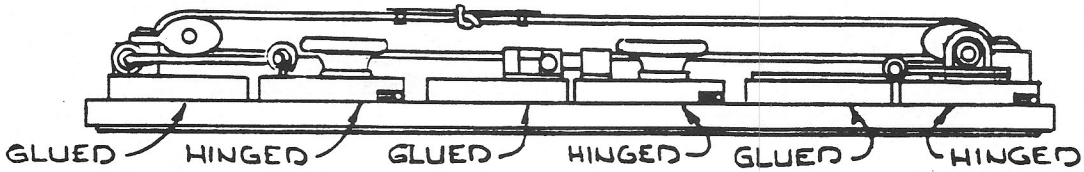


TOP VIEW OF MECHANICAL BOARD

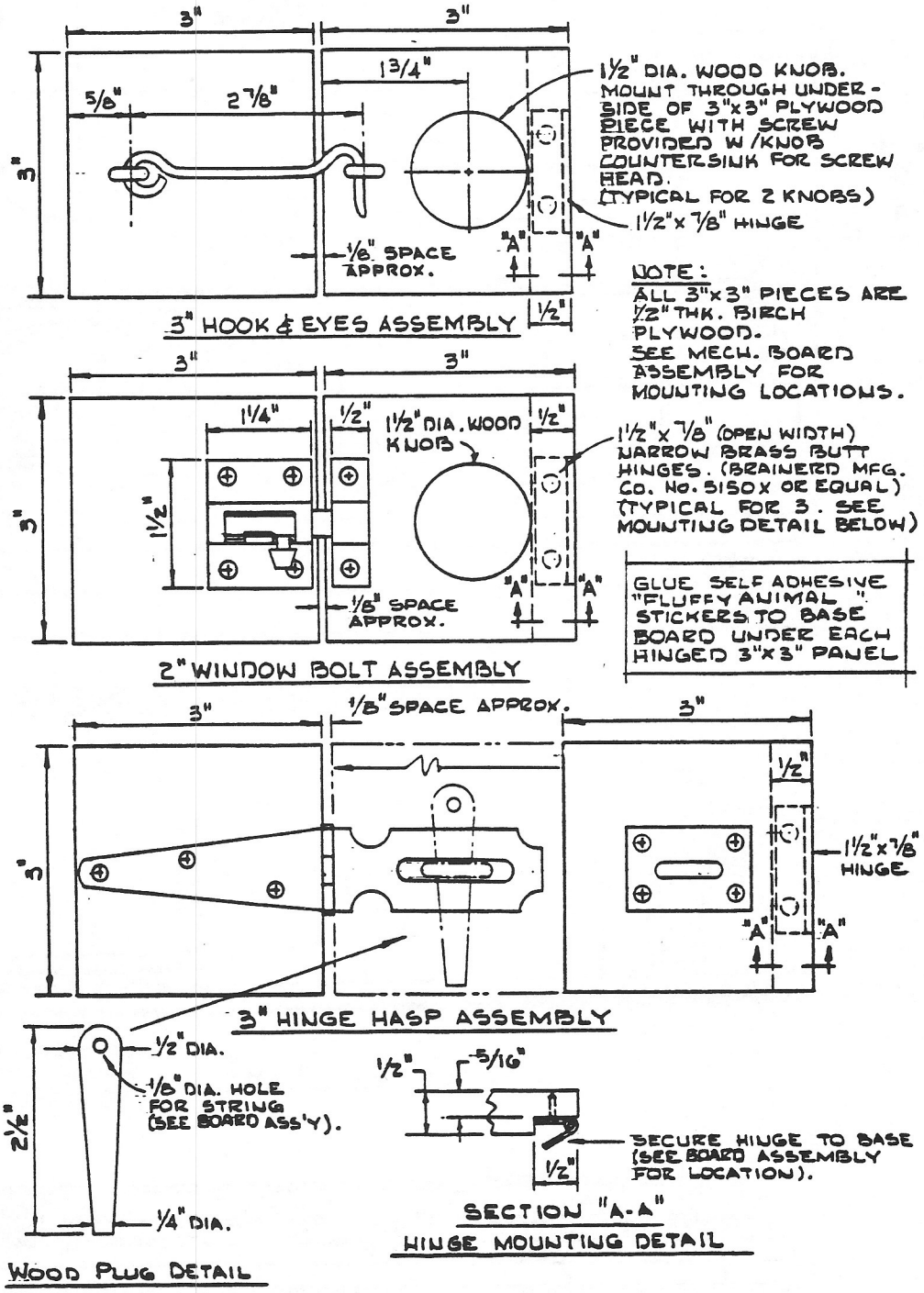


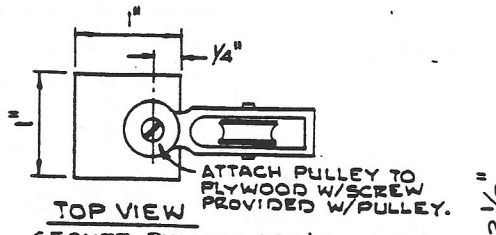
COVER UNDERSIDE WITH NON-SKID MATERIAL TO PREVENT SLIDING.

SECTION "A-A"



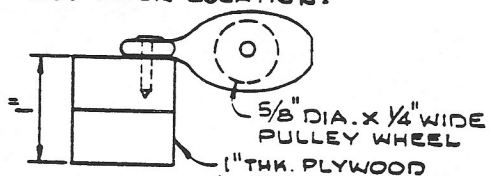
SECTION "B-B"


3"
3"
3"
13/4"
5/8"
2 7/8"
1/2" DIA. WOOD KNOB. MOUNT THROUGH UNDERSIDE OF 3"x3" PLYWOOD PIECE WITH SCREW PROVIDED W/KNOB COUNTERSINK FOR SCREW HEAD. (TYPICAL FOR 2 KNOBS)
1 1/2"x 7/8" HINGE
1/8" SPACE APPROX.
"A"
"A"
1/2"
3" HOOK & EYES ASSEMBLY
NOTE:
ALL 3"x3" PIECES ARE 1/2" THK. BIRCH PLYWOOD.
SEE MECH. BOARD ASSEMBLY FOR MOUNTING LOCATIONS.
3"
3"
1 1/4"
1/2"
1/2" DIA. WOOD KNOB
1/2"
1 1/2"x 7/8" (OPEN WIDTH) NARROW BRASS BUTT HINGES. (BRAINERD MFG. CO. NO. 5150X OR EQUAL) (TYPICAL FOR 3. SEE MOUNTING DETAIL BELOW)
1 1/2"
3"
1/8" SPACE APPROX.
"A"
"A"
GLUE SELF ADHESIVE "FLUFFY ANIMAL" STICKERS TO BASE BOARD UNDER EACH HINGED 3"x3" PANEL
2" WINDOW BOLT ASSEMBLY
3"
1/8" SPACE APPROX.
3"
1/2"
1 1/2"x 7/8" HINGE
3"
"A"
"A"
3" HINGE HASP ASSEMBLY
1/2" DIA.
1/8" DIA. HOLE FOR STRING (SEE BOARD ASS'Y).
2 1/2"
1/4" DIA.
WOOD PLUG DETAIL
1/2"
5/16"
1/2"
SECURE HINGE TO BASE (SEE BOARD ASSEMBLY FOR LOCATION).
SECTION "A-A"
HINGE MOUNTING DETAIL



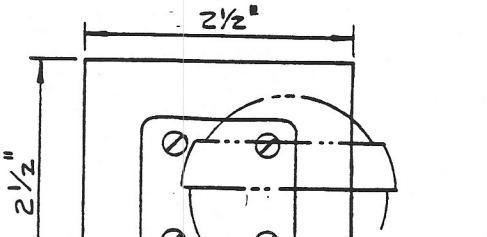
TOP VIEW

SECURE PULLEY ASS'Y TO BASE WITH GLUE. SEE BASE ASS'Y FOR LOCATION.

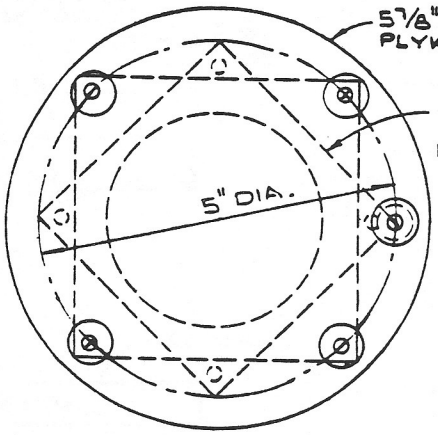


FRONT VIEW

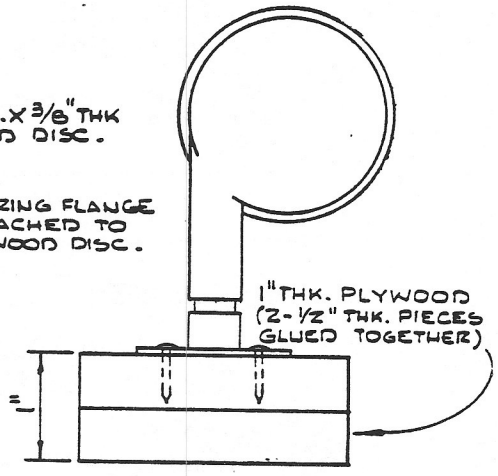
PULLEY ASSEMBLY
(2 REQUIRED)



TOP VIEW



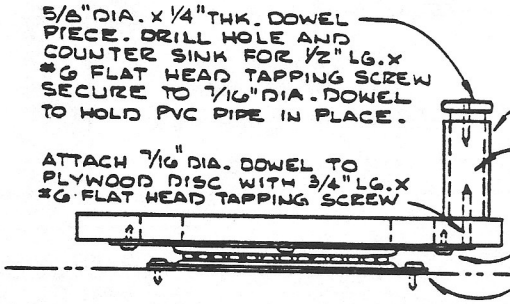
TOP VIEW OF LAZY SUSAN ASS'Y



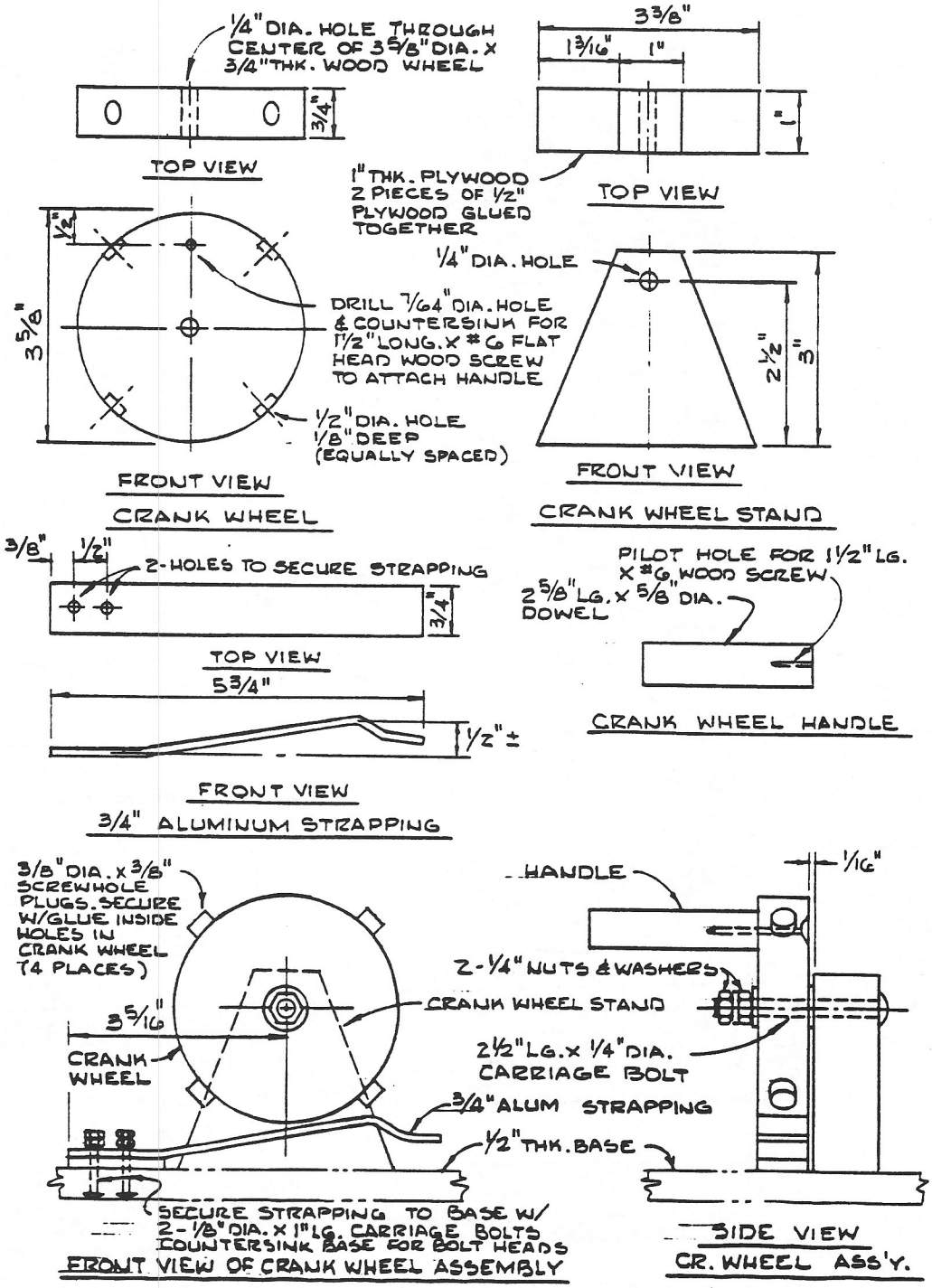
FRONT VIEW

CARPET BALL CASTER ASS'Y

SECURE CASTER ASS'Y TO BASE WITH GLUE. SEE BASE ASS'Y FOR LOCATION.

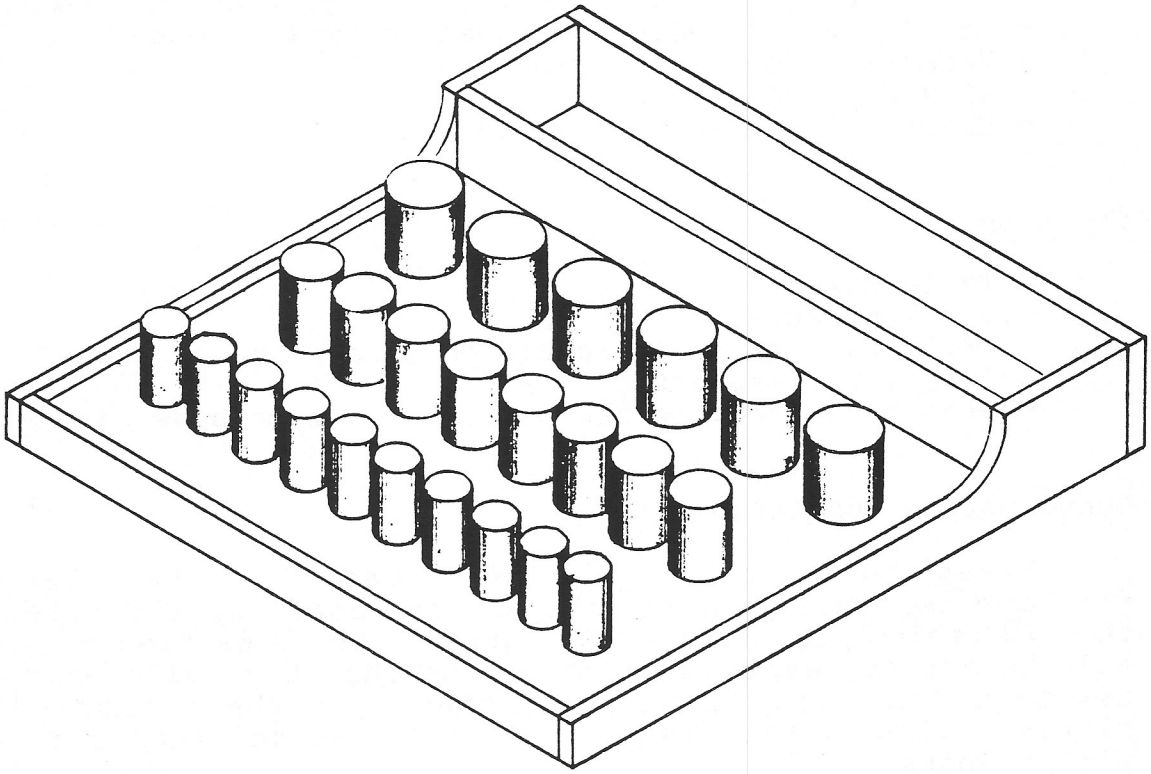

5/8" DIA. x 1/4" THK. DOWEL PIECE. DRILL HOLE AND COUNTER SINK FOR 1/2" LG. x #6 FLAT HEAD TAPPING SCREW SECURE TO 7/16" DIA. DOWEL TO HOLD PVC PIPE IN PLACE.
ATTACH 7/16" DIA. DOWEL TO PLYWOOD DISC WITH 3/4" LG. x #6 FLAT HEAD TAPPING SCREW
5/8" O.D. x 1 3/8" LG. PVC PIPE
7/16" DIA. x 1 1/2" LG. DOWEL
SECURE 4" TRIANGLE MFG. CO. LAZY SUSAN BEARINGS TO 5 7/8" DIA. PLYWOOD DISC FIRST.
NEXT SECURE LAZY SUZAN ASS'Y TO BASE USE 5/8" DIA. HOLES IN PLYWOOD DISC FOR ACCESS TO SCREWS (SEE BASE ASS'Y FOR LOCATION OF LAZY SUSAN).

FRONT VIEW OF LAZY SUSAN ASS'Y

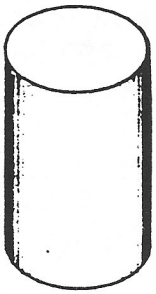

1/4" DIA. HOLE THROUGH CENTER OF 3 5/8" DIA. X 3/4" THK. WOOD WHEEL
3/4"
TOP VIEW
3 3/8"
1 3/16"
1"
1"
1" THK. PLYWOOD 2 PIECES OF 1/2" PLYWOOD GLUED TOGETHER
TOP VIEW
1/2"
3 5/8"
DRILL 7/64" DIA. HOLE & COUNTERSINK FOR 1 1/2" LONG. X #6 FLAT HEAD WOOD SCREW TO ATTACH HANDLE
1/2" DIA. HOLE 1/8" DEEP (EQUALLY SPACED)
FRONT VIEW
CRANK WHEEL
1/4" DIA. HOLE
2 1/2"
3"
FRONT VIEW
CRANK WHEEL STAND
3/8"
1/2"
2-HOLES TO SECURE STRAPPING
3/4"
TOP VIEW
5 3/4"
1/2" ±
FRONT VIEW
3/4" ALUMINUM STRAPPING
PILOT HOLE FOR 1 1/2" LG. X #6 WOOD SCREW
2 5/8" LG. X 5/8" DIA. DOWEL
CRANK WHEEL HANDLE
3/8" DIA. X 3/8" SCREWHOLE PLUGS. SECURE W/GLUE INSIDE HOLES IN CRANK WHEEL (4 PLACES)
3 5/16"
CRANK WHEEL
SECURE STRAPPING TO BASE W/ 2-1/8" DIA. X 1" LG. CARRIAGE BOLTS COUNTERSINK BASE FOR BOLT HEADS
FRONT VIEW OF CRANK WHEEL ASSEMBLY
HANDLE
1/16"
2-1/4" NUTS & WASHERS
CRANK WHEEL STAND
2 1/2" LG. X 1/4" DIA. CARRIAGE BOLT
3/4" ALUM STRAPPING
1/2" THK. BASE
SIDE VIEW
CR. WHEEL ASS'Y.

PEGBOARD

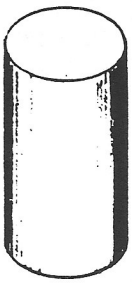
This orderly pegboard has pegs of three colors and three sizes. There is a convenient storage compartment behind the board.



* Please use caution when using this toy with children who may put small parts into their mouths. *



1¼" DIA. x 2" LG. PEG
6 REQ'D PLUS 2 SPARES
PAINT BLUE



1" DIA. x 2" LG. PEG
8 REQ'D PLUS 2 SPARES
PAINT RED

¾" DIA. x 2" LG. PEG
10 REQ'D PLUS 2 SPARES
PAINT YELLOW

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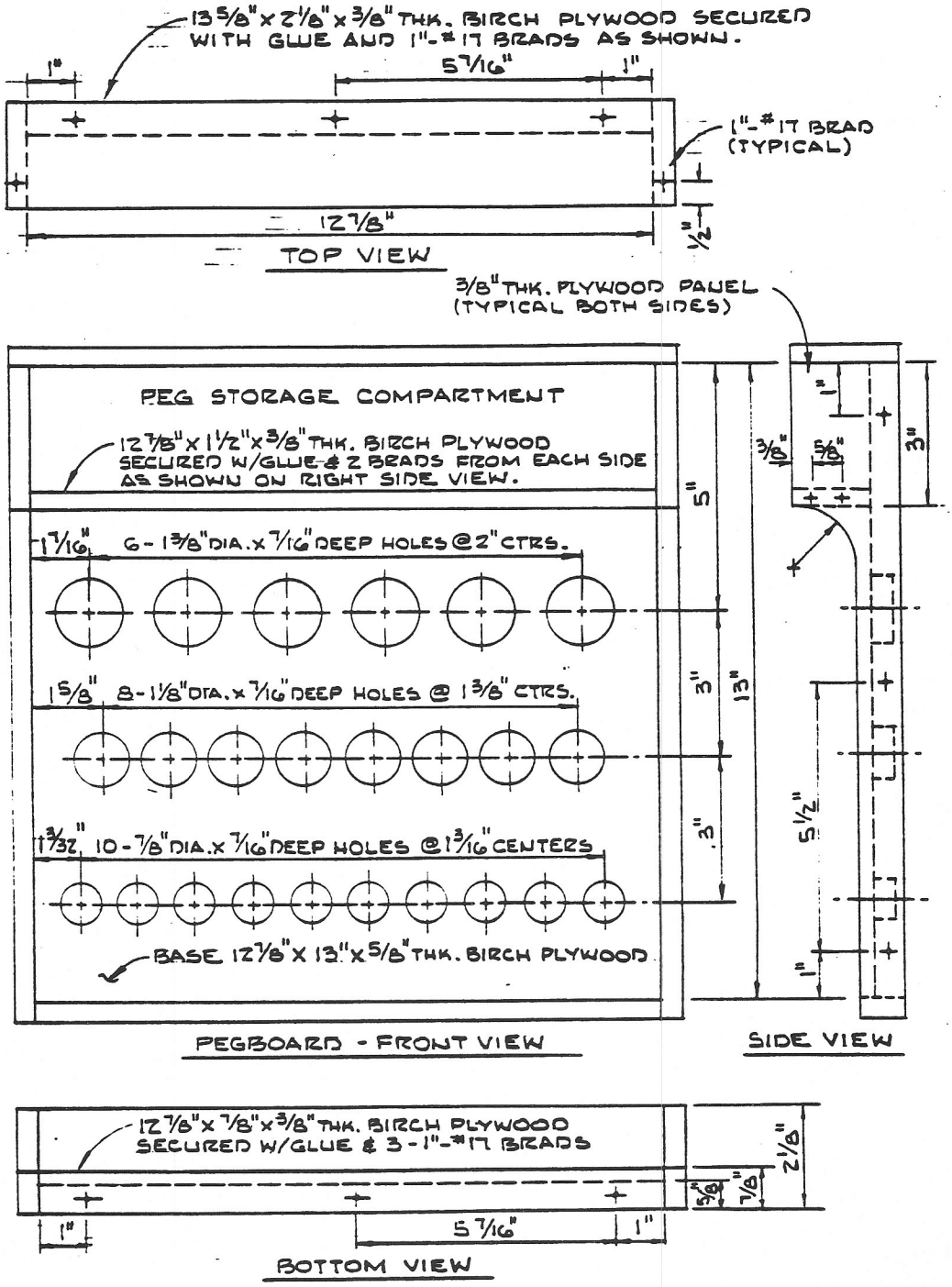
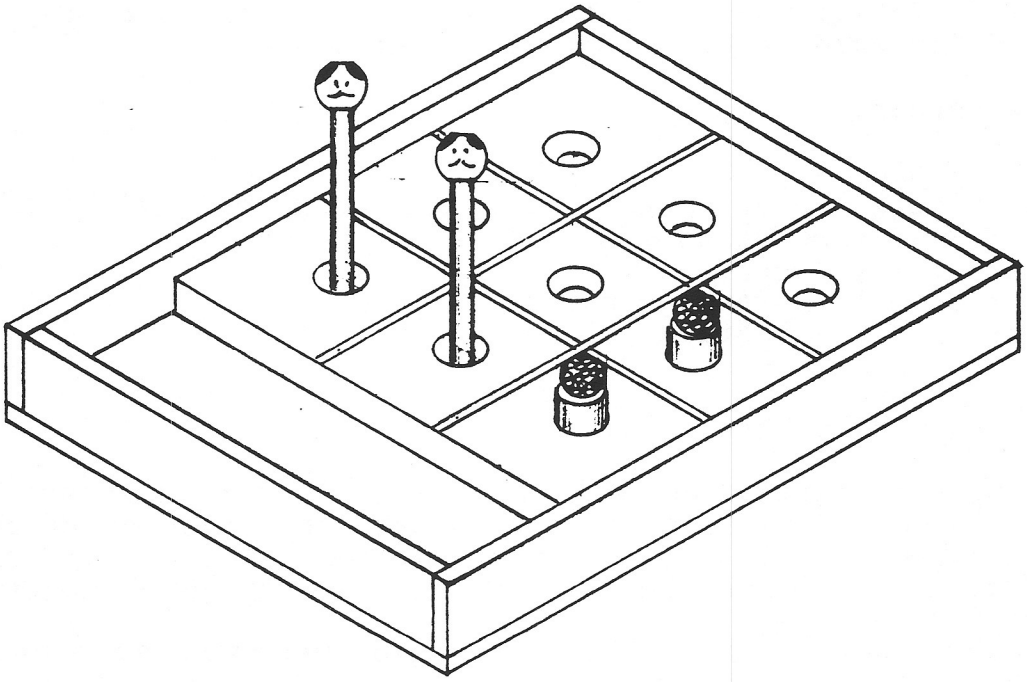
board on the turntable. Using Varathane spray cans of enamel, spray on one coat. When dry, spray on a second coat. Then reverse the pegs and spray again. For durability and a finished look, spray with a coat of gloss Varathane varnish.


13 5/8" x 2 1/8" x 3/8" THK. BIRCH PLYWOOD SECURED WITH GLUE AND 1"-#17 BRADS AS SHOWN.
1"
5 7/16"
1"
1"-#17 BRAD (TYPICAL)
12 7/8"
1/2"
TOP VIEW
3/8" THK. PLYWOOD PANEL (TYPICAL BOTH SIDES)
PEG STORAGE COMPARTMENT
12 7/8" x 1 1/2" x 3/8" THK. BIRCH PLYWOOD SECURED W/GLUE & 2 BRADS FROM EACH SIDE AS SHOWN ON RIGHT SIDE VIEW.
1 7/16"
6 - 1 3/8" DIA. x 7/16" DEEP HOLES @ 2" CTRS.
1 5/8"
8 - 1 1/8" DIA. x 7/16" DEEP HOLES @ 1 3/8" CTRS.
1 3/32"
10 - 7/8" DIA. x 7/16" DEEP HOLES @ 1 3/16" CENTERS
BASE 12 7/8" X 13" x 5/8" THK. BIRCH PLYWOOD
5"
3"
3"
13"
1"
3/8"
5/8"
3"
5 1/2"
1"
PEGBOARD - FRONT VIEW
SIDE VIEW
12 7/8" x 7/8" x 3/8" THK. BIRCH PLYWOOD SECURED W/GLUE & 3 - 1"-#17 BRADS
5/8"
7/8"
2 1/8"
1"
5 7/16"
1"
BOTTOM VIEW

TIC-TAC-TOE BOARD

This is a colorful Tic-Tac-Toe board that uses two sizes of whimsically decorated pegs for markers. A tray to one side holds both the tall slim pegs with painted heads and the short stout pegs with colored beads.

* Please use caution when using this toy with children who may put small parts into their mouths. *



TIC-TAC-TOE BOARD

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Materials needed:

- 1/4" birch plywood, 13 5/8" x 10 5/8"
- 3/8" birch plywood, 9 7/8" x 9 7/8"
- 5/8" birch plywood, 9 7/8" x 9 7/8"
- Two pieces 3/8" birch plywood, 1 1/2" x 9 7/8"
- Two pieces 3/8" birch plywood, 1 1/2" x 13 5/8"
- 1/8" wide colored tape with adhesive backing
- 9 pieces 1/2" diameter dowel x 4" long
- 9 pieces 3/8" diameter dowel x 1" long
- 9 pieces 1" diameter dowel x 1" long
- 9 doll heads of 25 mm or 1" diameter spheres
- 9 colored beads, 3/4" or 1" diameter
- 9 or 18 1 1/4" x #6 Phillips flat head wood screws
- 1 drawstring or ziplock bag to store the pegs in
- Non-skid material for bottom of board

Tools needed:

- Table saw
- Drill press, power boring bits of 1" and 1/2" diameters
- 3/8" brad point wood bit
- Ruler, brush, etc.
- Elmer's Carpenter's Glue
- 3/4" x #17 brads

Construction suggestions:

Glue together the 3/8" and the 5/8" pieces that are 9 7/8" x 10 5/8". Sand the sides evenly. Mark the placement of the holes as on page 4. Drill the 1" diameter holes 1/2" deep. Drill the 1/2" diameter holes the rest of the way through. Sand the top edges of the holes.

Cut the 3/8" x 1 1/2" pieces to proper lengths and fasten with glue and brads onto the sides and ends to form the box. Fasten the 1/4" x 13 5/8" x 10 5/8" pieces onto the bottom using glue and brads. Sand all joints, corners and top edges.

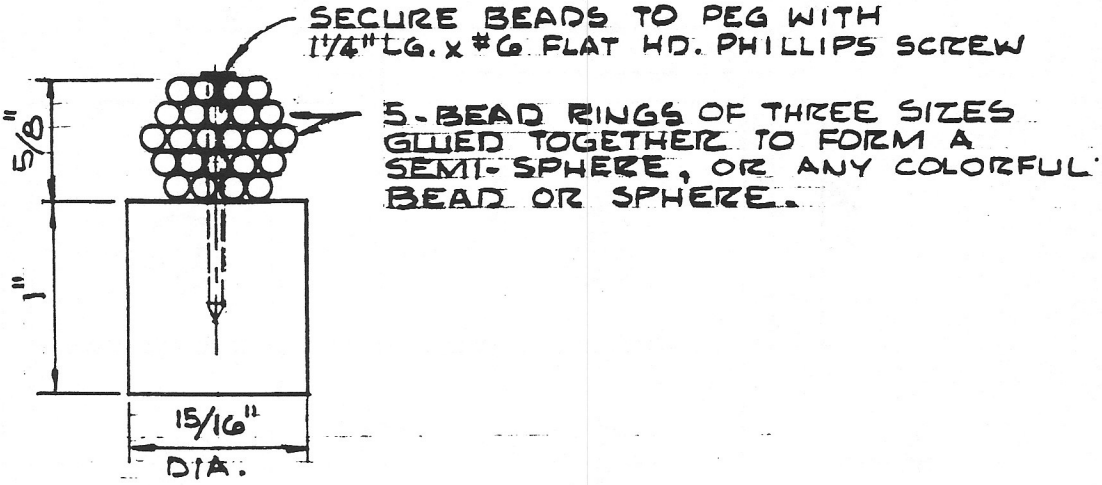
Use masking tape and yellow and green paint to give the box a two-toned look. Finish the box with yellow 1/8" wide tape put on the green top to make the tic-tac-toe double-crossed lines.

Before cutting the dowels to correct length, sand down both the 1" and the 1/2" size so that when cut and painted two coats, they will fit into the 1" and 1/2" holes in the board.

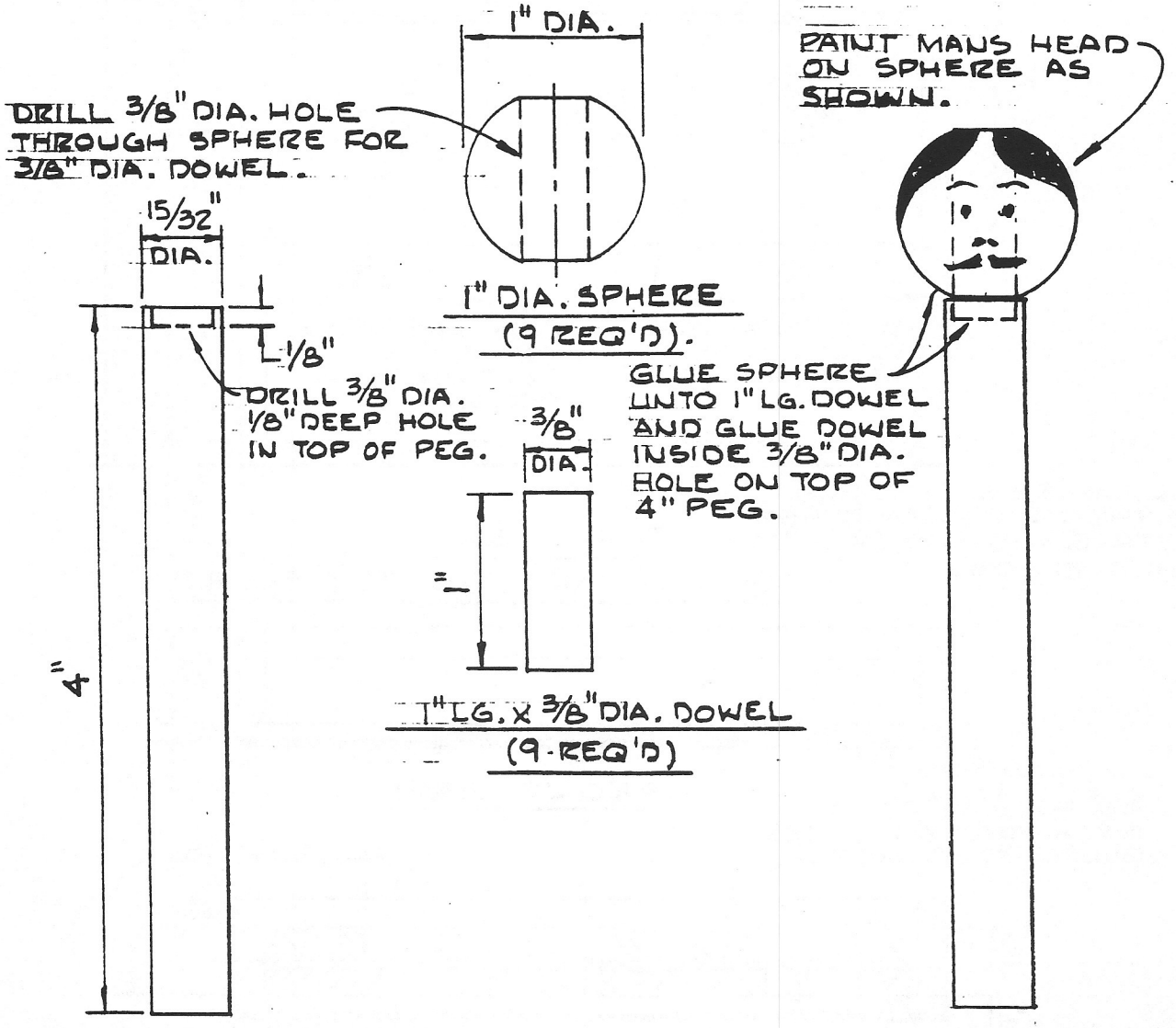
Drill a pilot hole down the center of the large diameter, short pegs. Securely fasten a bead onto the top of the peg with a screw as detailed in the drawing on page 3.

Drill a 3/8" diameter hole 1/8" deep into one end of the 1/2" diameter pegs. Then a dowel holds the doll head or sphere onto the peg. See detail on the drawing on page 3.

Keep the pegs in a cloth drawstring bag or heavyweight ziplock bag when toy is not in use.


SECURE BEADS TO PEG WITH 1¼" LG. x #6 FLAT HD. PHILLIPS SCREW
5-BEAD RINGS OF THREE SIZES GLUED TOGETHER TO FORM A SEMI-SPHERE, OR ANY COLORFUL BEAD OR SPHERE.
5/8"
1"
15/16" DIA.

1" x 15/16" DIA. PEG DETAIL (9 REQ'D).

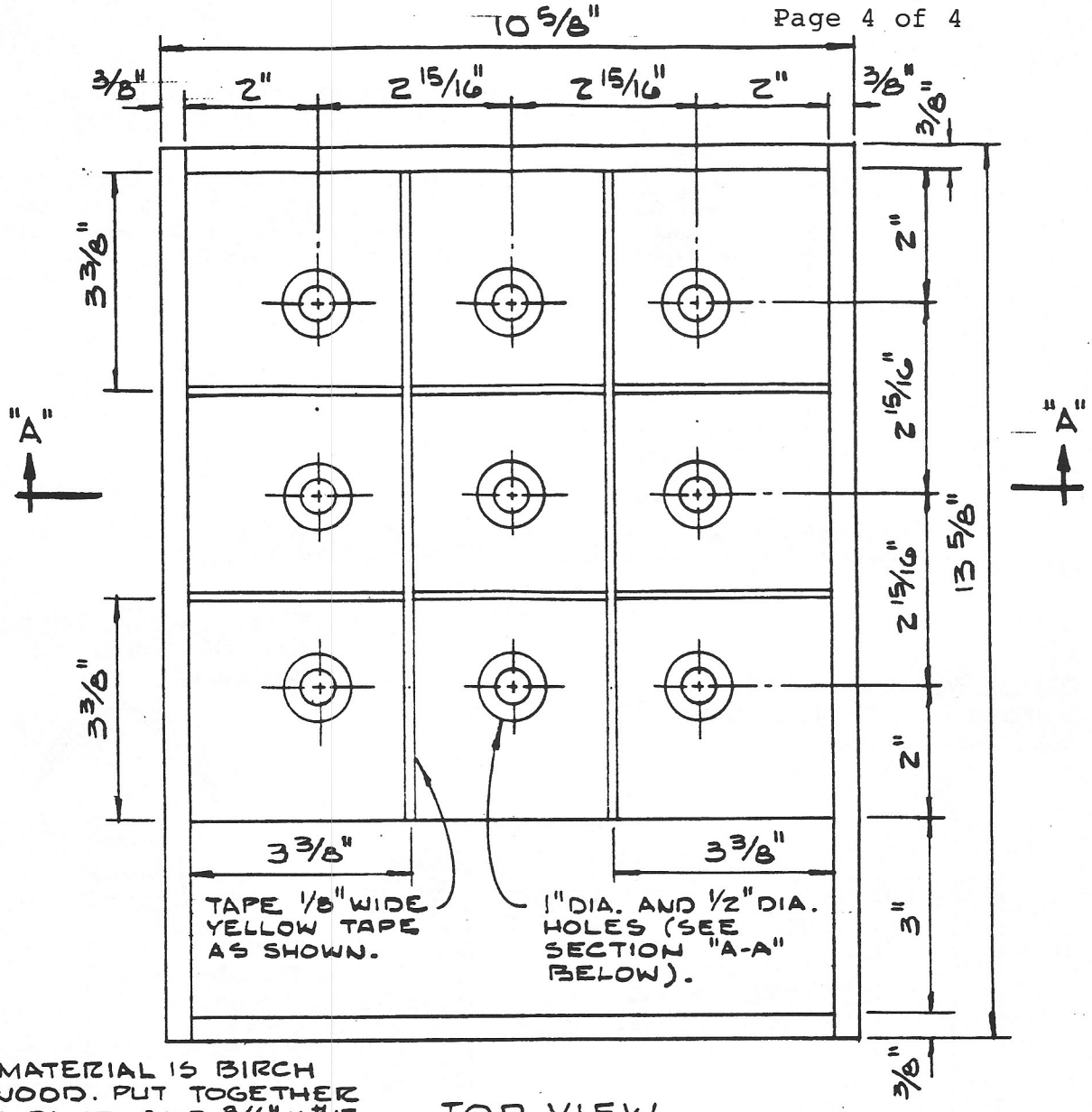

1" DIA.
DRILL 3/8" DIA. HOLE THROUGH SPHERE FOR 3/8" DIA. DOWEL.
15/32" DIA.
1/8"
DRILL 3/8" DIA. 1/8" DEEP HOLE IN TOP OF PEG.
4"
3/8" DIA.
1"
PAINT MANS HEAD ON SPHERE AS SHOWN.
GLUE SPHERE UNTO 1" LG. DOWEL AND GLUE DOWEL INSIDE 3/8" DIA. HOLE ON TOP OF 4" PEG.

1" DIA. SPHERE
(9 REQ'D).

1" LG. x 3/8" DIA. DOWEL
(9 REQ'D)

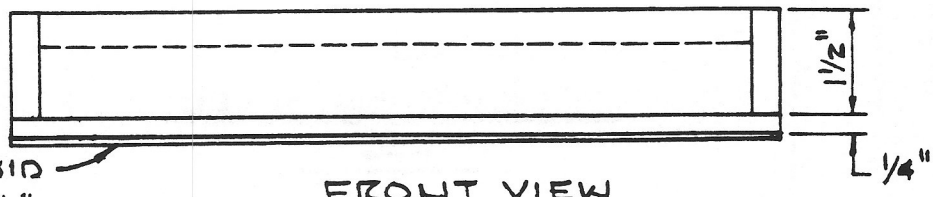
4" LG. x 15/32" DIA. PEG DETAIL
(9 REQ'D).

ASSEMBLY OF SPHERE TO 4" PEG
(9 REQ'D)



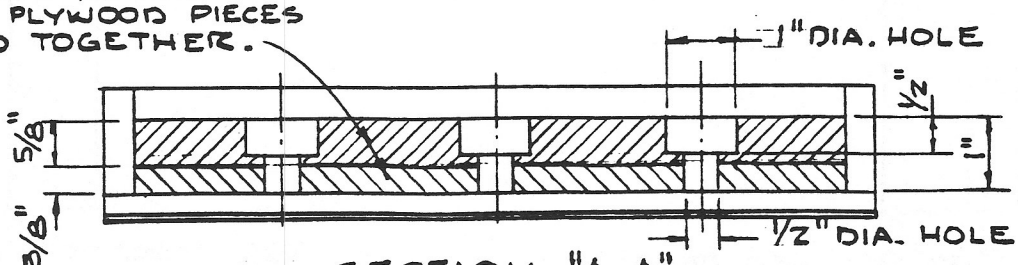
ALL MATERIAL IS BIRCH PLYWOOD. PUT TOGETHER WITH GLUE AND 3/4" x #17 WIRE BRADS.

TOP VIEW
OF TIC-TAC-TOE TOY BOARD



FRONT VIEW

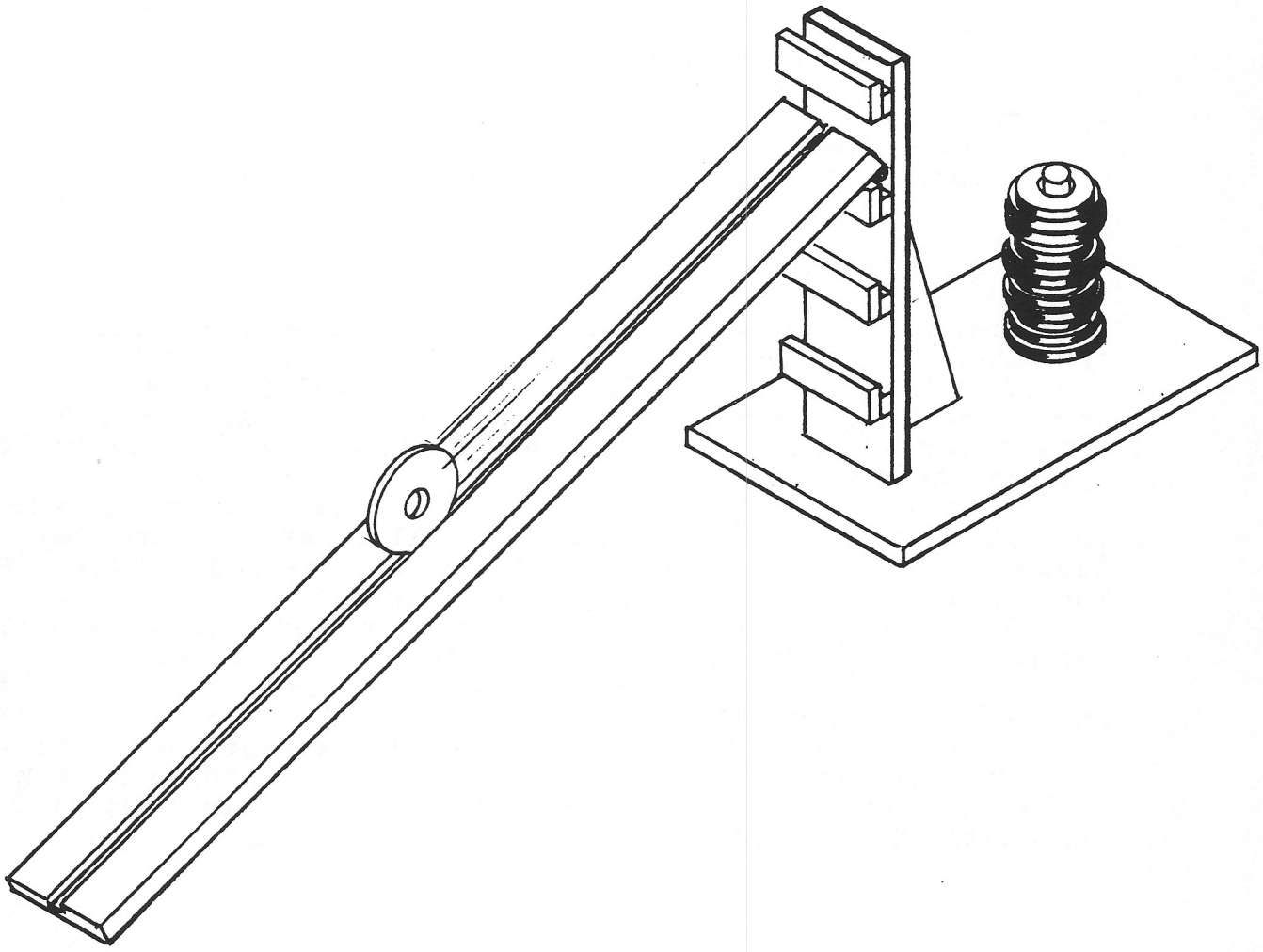
5/8" THK. & 3/8" THK. BIRCH PLYWOOD PIECES GLUED TOGETHER.



SECTION "A-A"

DISC ROLLER

The disc roller is a rugged and colorful toy that promotes activity. The discs are placed on the easily adjusted ramp, and the child watches as they roll down. Retrieving the discs can be fun, too!



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Materials needed:

- 3/8", 1/2", 5/8" Birch plywood, cut as shown
- One 1/2" diameter x 5 1/2" long dowel
- Ten 1" long x #6 Phillips screws
- Varathane gloss varnish or equal
- Elmer's Carpenter's Glue or equal
- 1" long #17 brads

Tools needed:

- Table saw
- Power sander or sandpaper
- 1/2" and 5/8" drill bits
- Circle cutter
- Drill press
- Hammer, ruler, screwdriver, brush, etc.

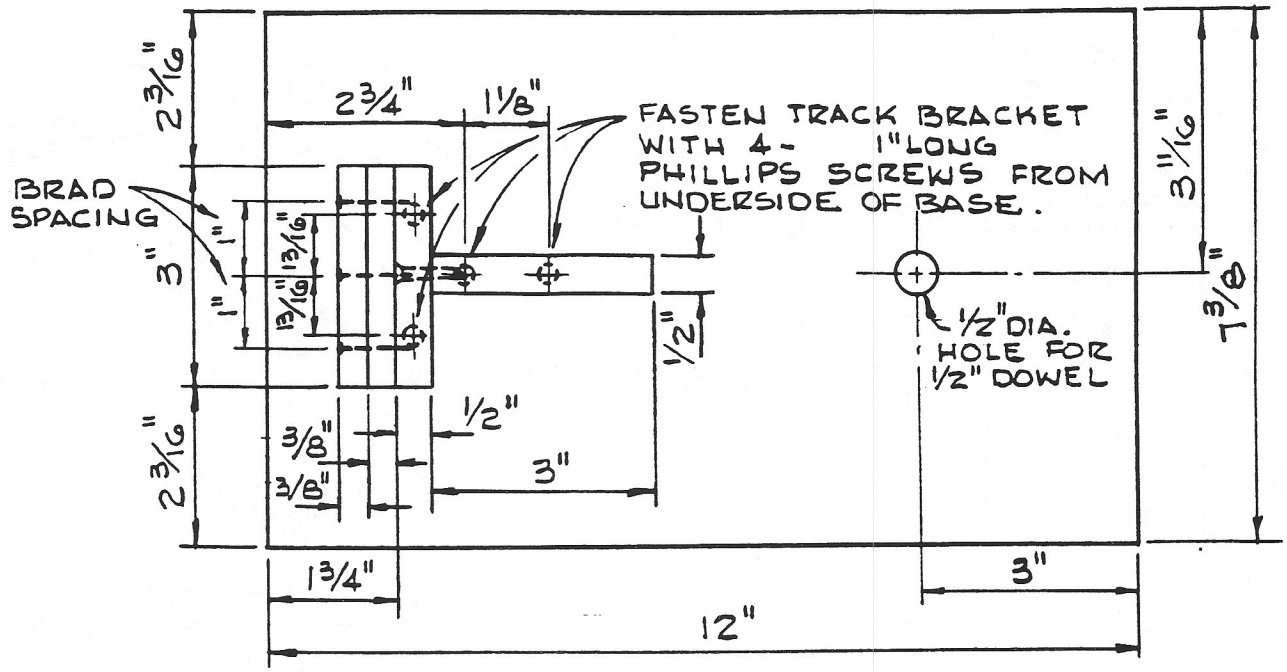
Construction suggestions:

Cut out the base, track bracket, triangular stiffener and the track holder pieces as detailed on page 3. Drill the 1/2" hole for the 5 1/2" long dowel. Glue dowel in hole. Glue and screw track holder pieces to track bracket. Glue and screw the triangular stiffener to the track bracket assembly to the base board as detailed on page 3.

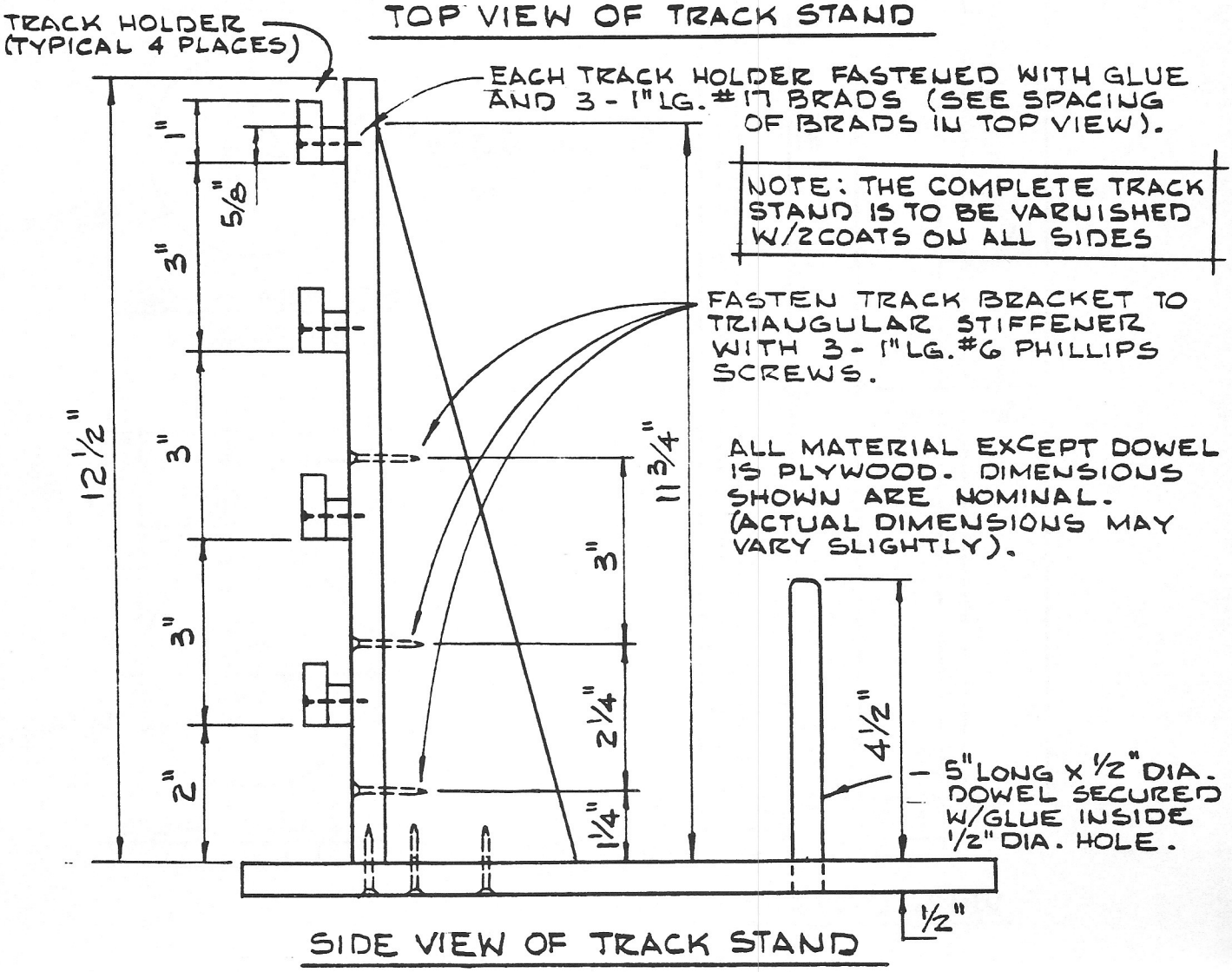
Cut out a 5/8" thick x 37" x 3" wheel track piece and cut the 3/8" wide x 5/16" deep slot the full length. Fasten the 1/4" diameter x 3" long dowel onto the track piece as shown. Make sure to sand the slot side to a very smooth condition.

Varnish the track stand assembly and the wheel track assembly two coats, sanding lightly in between coats.

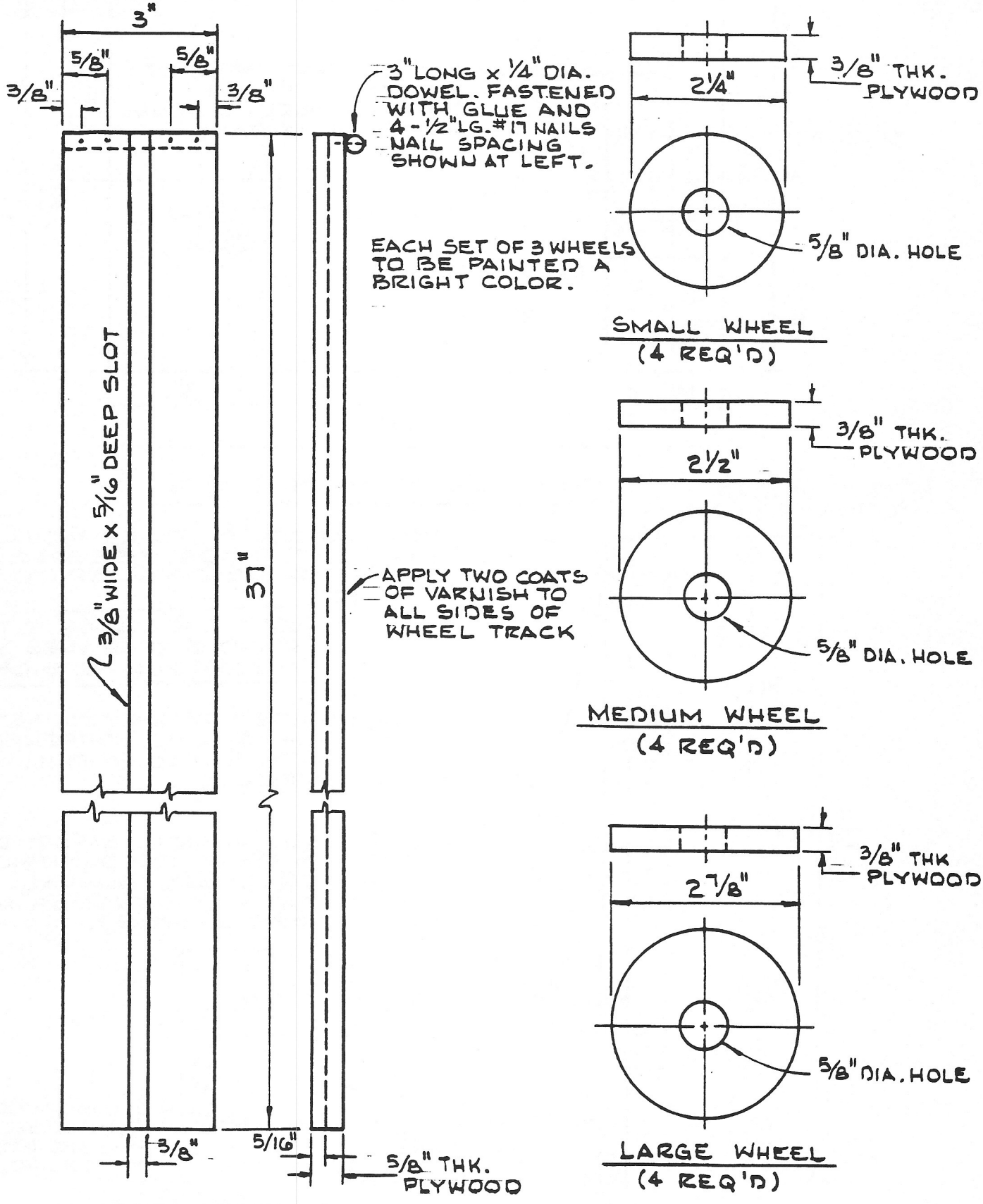
Using a circle cutter and the 3/8" plywood, cut out four each of the three disc diameters. Then drill a 5/8" diameter hole down the pilot hole left by the circle cutter in each disc. Sand the cut-out discs carefully. Paint each four similar diameter discs a bright color. Assemble the finished discs on the dowel and your disc roller is ready for play.



TOP VIEW OF TRACK STAND


TRACK HOLDER (TYPICAL 4 PLACES)
EACH TRACK HOLDER FASTENED WITH GLUE AND 3 - 1" LG. #17 BRADS (SEE SPACING OF BRADS IN TOP VIEW).
NOTE: THE COMPLETE TRACK STAND IS TO BE VARNISHED W/2 COATS ON ALL SIDES
FASTEN TRACK BRACKET TO TRIANGULAR STIFFENER WITH 3 - 1" LG. #6 PHILLIPS SCREWS.
ALL MATERIAL EXCEPT DOWEL IS PLYWOOD. DIMENSIONS SHOWN ARE NOMINAL. (ACTUAL DIMENSIONS MAY VARY SLIGHTLY).
1"
5/8"
3"
3"
3"
2"
12 1/2"
11 3/4"
3"
2 1/4"
1 1/4"
4 1/2"
5" LONG x 1/2" DIA. DOWEL SECURED W/GLUE INSIDE 1/2" DIA. HOLE.
1/2"

SIDE VIEW OF TRACK STAND


3"
5/8"
5/8"
3/8"
3/8"
3" LONG x 1/4" DIA. DOWEL. FASTENED WITH GLUE AND 4-1/2" LG. #17 NAILS NAIL SPACING SHOWN AT LEFT.
3/8" WIDE x 5/16" DEEP SLOT
37"
APPLY TWO COATS OF VARNISH TO ALL SIDES OF WHEEL TRACK
3/8"
5/16"
5/8" THK. PLYWOOD
WHEEL TRACK
2 1/4"
3/8" THK. PLYWOOD
5/8" DIA. HOLE
EACH SET OF 3 WHEELS TO BE PAINTED A BRIGHT COLOR.
SMALL WHEEL
(4 REQ'D)
2 1/2"
3/8" THK. PLYWOOD
5/8" DIA. HOLE
MEDIUM WHEEL
(4 REQ'D)
2 7/8"
3/8" THK PLYWOOD
5/8" DIA. HOLE
LARGE WHEEL
(4 REQ'D)

TRICYCLE PEDAL ADAPTERS

The purpose of these pedal adapters is to hold a child's feet firmly on the pedals of a tricycle, making is easier for the child to ride independently. They will fit almost any pedal, are simple to install, and are convenient to use.

Materials needed:

- 38" thick birch plywood
- Shellac or varnish
- 1" wide webbing (obtain from a fabric store)
- 1" wide velcro, both hook and loop (fabric store)
- 1/4" T-50 staples
- 3/16" washers
- 3/16" lock washers
- 3/16" wing nuts
- 3/16" x 2" carriage bolts
- 1" x #17 brads
- Ziglock bags

Tools needed:

- Table saw
- Band saw or saber saw
- Scissors
- Sewing machine
- Staple shooter
- 3/16" drill bit and power drill
- Compass, ruler, brush, sandpaper, etc.

Construction suggestions:

It seems logical to make up these pedal adapters in batches of, say, ten or twelve pairs. It will take about 4 square feet of plywood, 4 1/2 feet of webbing, and 2 1/2 feet of velcro to make 10 pairs of pedal adapters.

Follow the drawings on pages 2 and 3, as almost all contruction details are noted there. Glue and nail the heel or end piece to the foot piece. Shellac the wood pieces to make them somewhat cleanable.

It is a good idea to put all the finished parts for one pair into a ziplock bag, including a copy of the assembly diagram (page 2) to assist in assembly onto the pedals.

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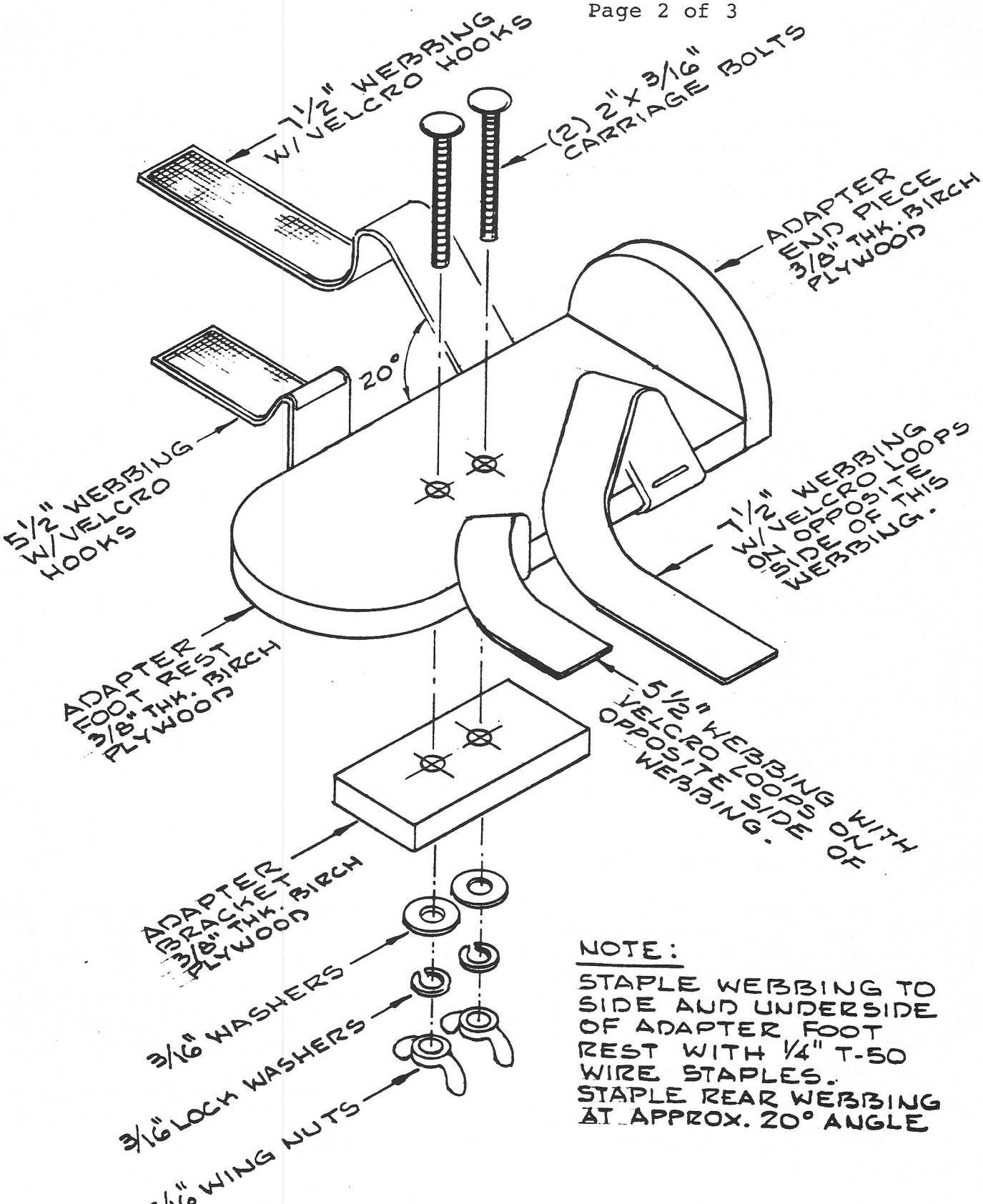
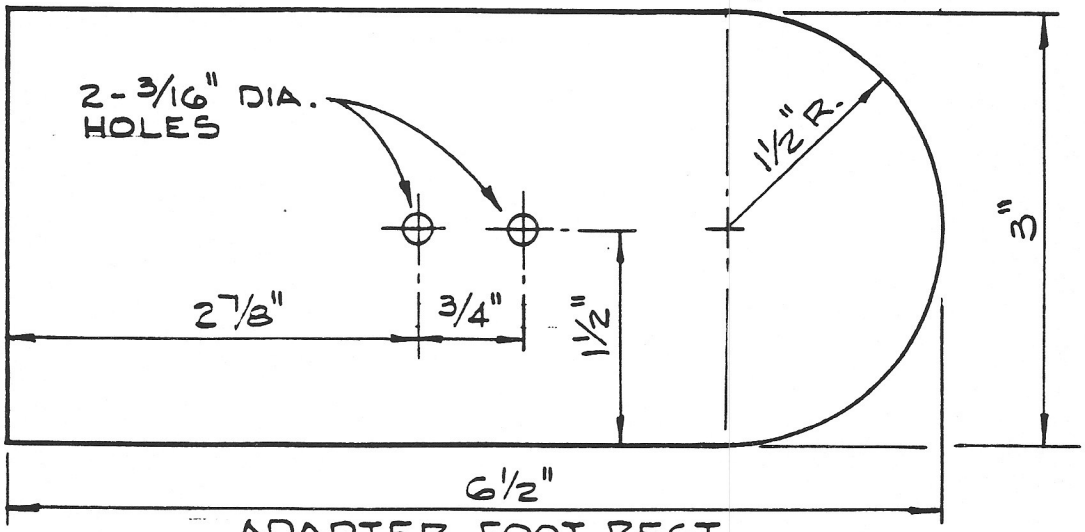

7 1/2" WEBBING W/ VELCRO HOOKS
(2) 2" x 3/16" CARRIAGE BOLTS
ADAPTER END PIECE 3/8" THK. BIRCH PLYWOOD
20°
5 1/2" WEBBING W/ VELCRO HOOKS
7 1/2" WEBBING W/ VELCRO LOOPS ON OPPOSITE SIDE OF THIS WEBBING.
ADAPTER FOOT REST 3/8" THK. BIRCH PLYWOOD
5 1/2" WEBBING WITH VELCRO LOOPS ON OPPOSITE SIDE OF WEBBING.
ADAPTER BRACKET 3/8" THK. BIRCH PLYWOOD
3/16" WASHERS
3/16" LOCK WASHERS
3/16" WING NUTS

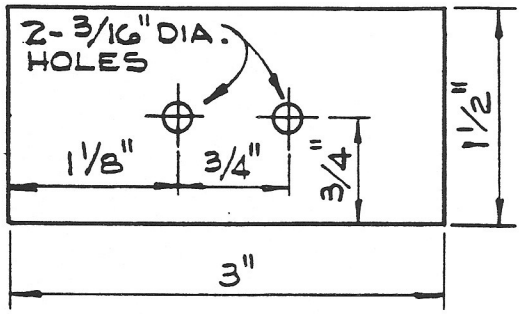
NOTE:

STAPLE WEBBING TO SIDE AND UNDERSIDE OF ADAPTER FOOT REST WITH 1/4" T-50 WIRE STAPLES. STAPLE REAR WEBBING AT APPROX. 20° ANGLE

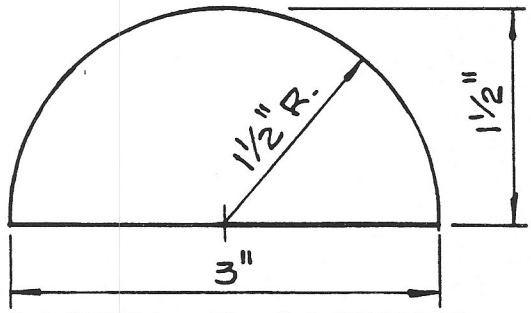
EXPLODED VIEW OF TRICYCLE PEDAL ADAPTER



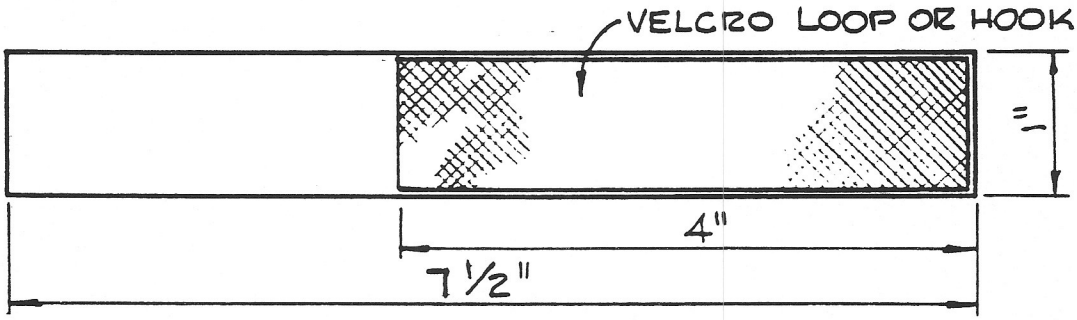
ADAPTER FOOT REST



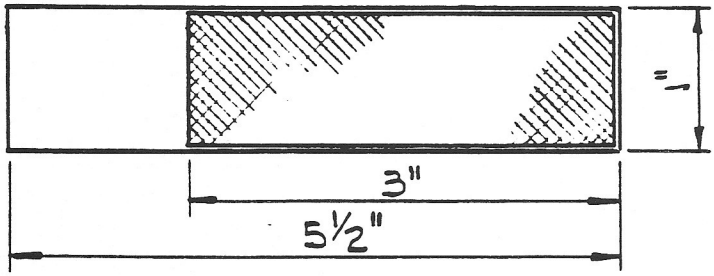
ADAPTER BRACKET



ADAPTER END PIECE



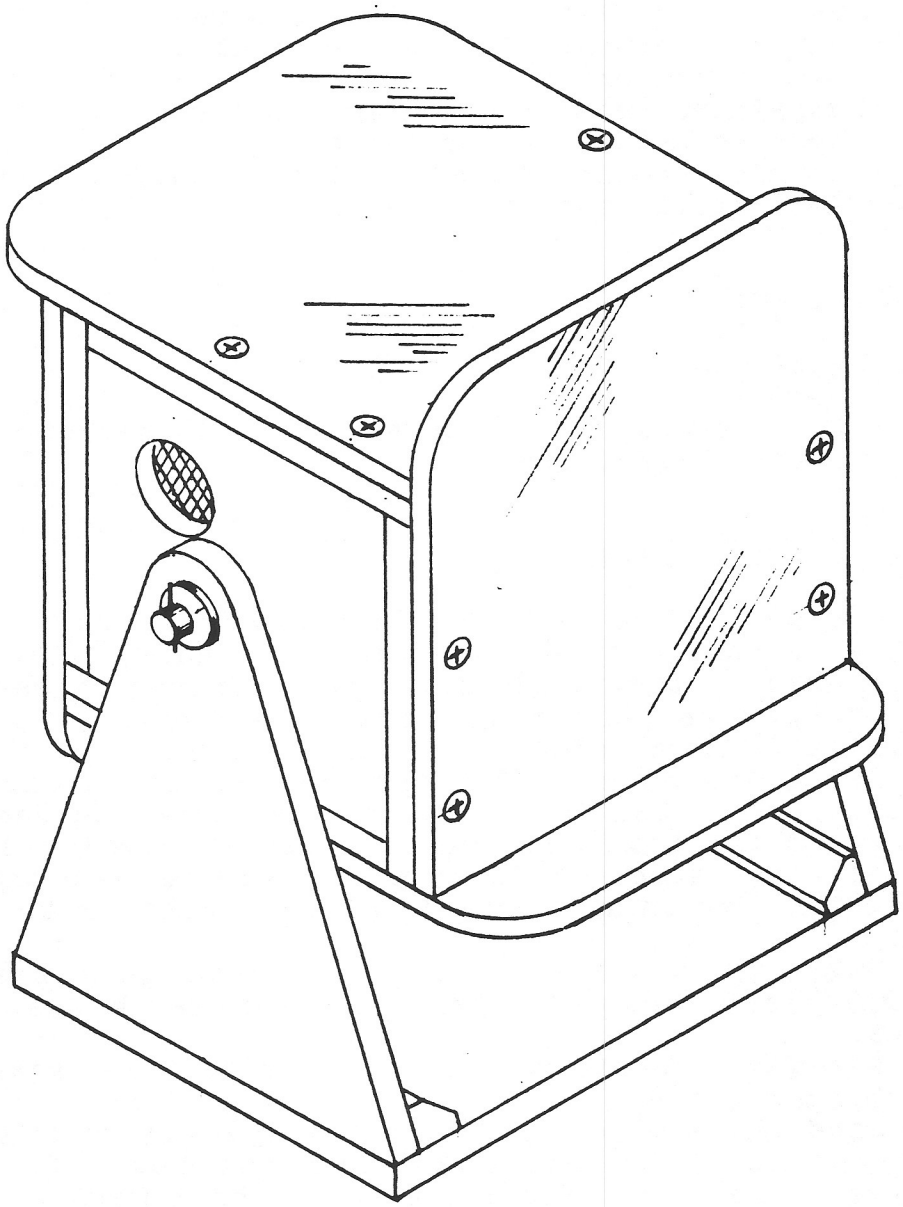
1" WEBBING (2 REQUIRED) ONE W/VELCRO LOOP PATCH, ONE W/HOOK PATCH SEWN TO WEBBING



1" WEBBING (2 REQUIRED)
ONE W/VELCRO LOOP PATCH
ONE W/VELCRO HOOK PATCH
SEWN TO WEBBING

REFLECTION BOX

Unbreakable plastic mirrors on four sides of this box makes it fascinating to most children. It rotates easily with a push and the jingle bells inside provide auditory interest.



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Materials needed:

- 3/8" birch plywood of several sizes as detailed on pages three and four, including the 5/8" x 5/8" x 6" corner braces sawn from two 3/8" strips glued together
- 3/8" diameter dowel x 8 5/8" long
- Two pieces of 1 1/2" x 1 1/2" window screen
- Four pieces of 1/4" thick plexiglas mirror, 7" x 7"
- Two pieces of 1/2" x #4 sheet metal screws
- Four washers with 3/8" center holes
- 16 1" x #6 flat head Phillips screws
- Elmer's Carpenter's Glue or equal
- 3/4" x #16 brads
- Varathane enamel in a bright color
- Non-skid material for bottom
- Contact cement or double-sided "Scotch" tape
- Anti-static plastic cleaner

Tools needed:

- Table saw
- Sander
- Drill press, 1 1/4" power bore bit, set of regular bits
- Ruler, brush, etc.

Construction suggestions:

Cut out pieces for the box and drill the end pieces for the dowel axle and for the 1 1/4" diameter holes. Staple the screen wire pieces on the inside over the end piece holes.

Using glue and brads, assemble the box, putting in the jingle bells just before the last box piece.

Drill and countersink the four holes on each of the four mirror pieces. Cut the curves on the mirror corners.

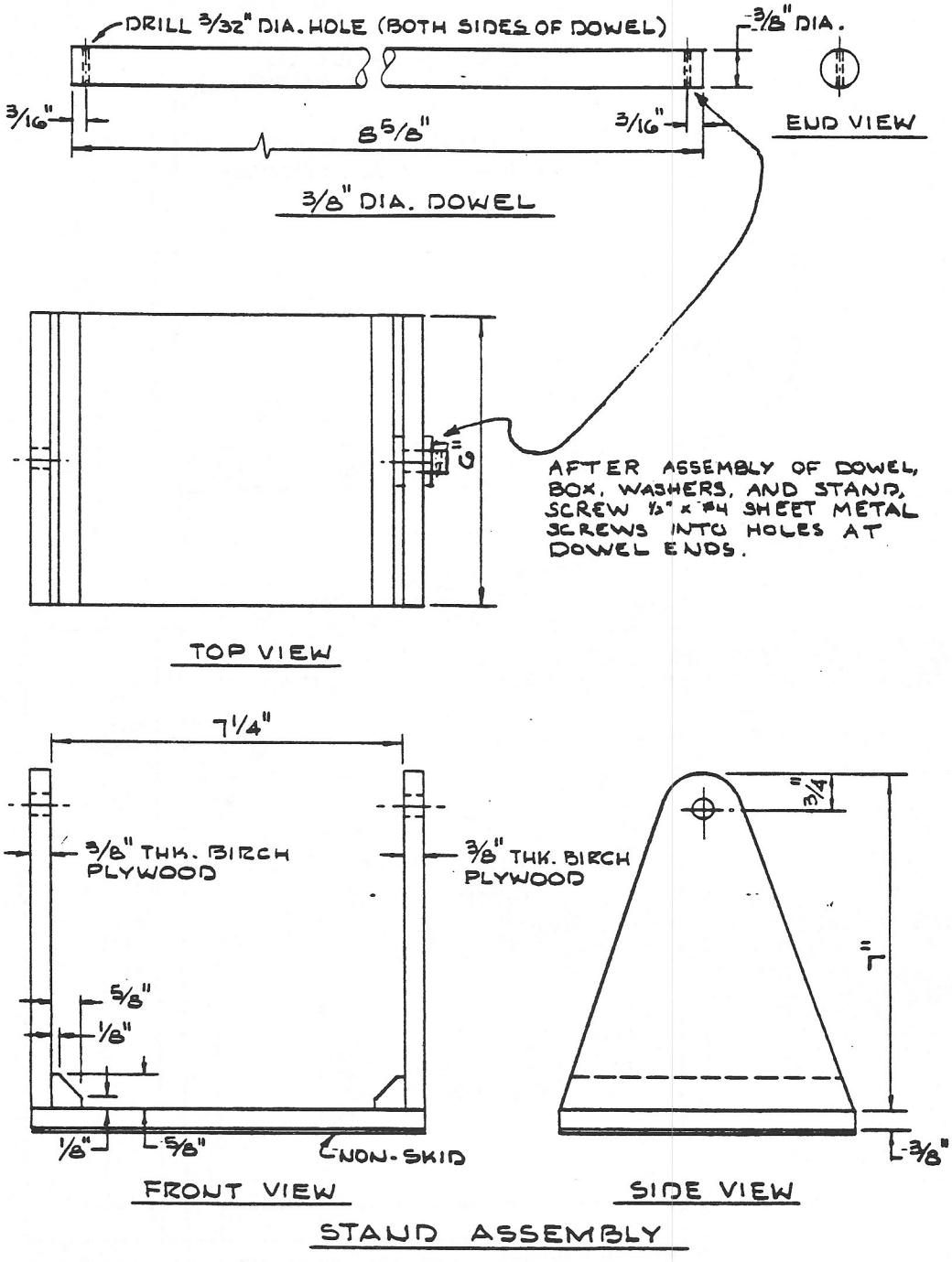
Paint the box ends two coats of a bright color. When the paint is dry, screw the four mirror pieces onto the box as shown on page 4. Use an anti-static plastic cleaner to eliminate the lint.

Cut out the stand pieces. Locate the axle hole in the upright pieces and drill the 3/8" diameter holes. Sand all the pieces.

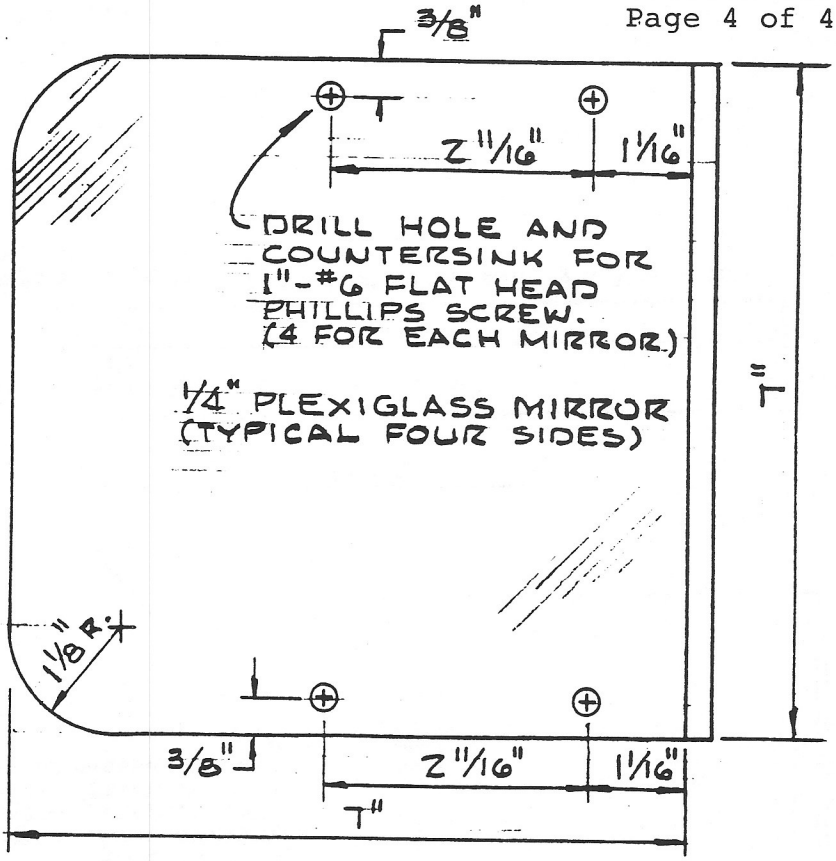
Assemble the stand as shown on page 1 and give it two coats of a bright color.

Sand the 3/8" x 8 5/8" dowel to permit it to be put through the 3/8" holes in the stand and the box. Drill the 3/32" diameter hole 3/16" from the ends of the dowel.

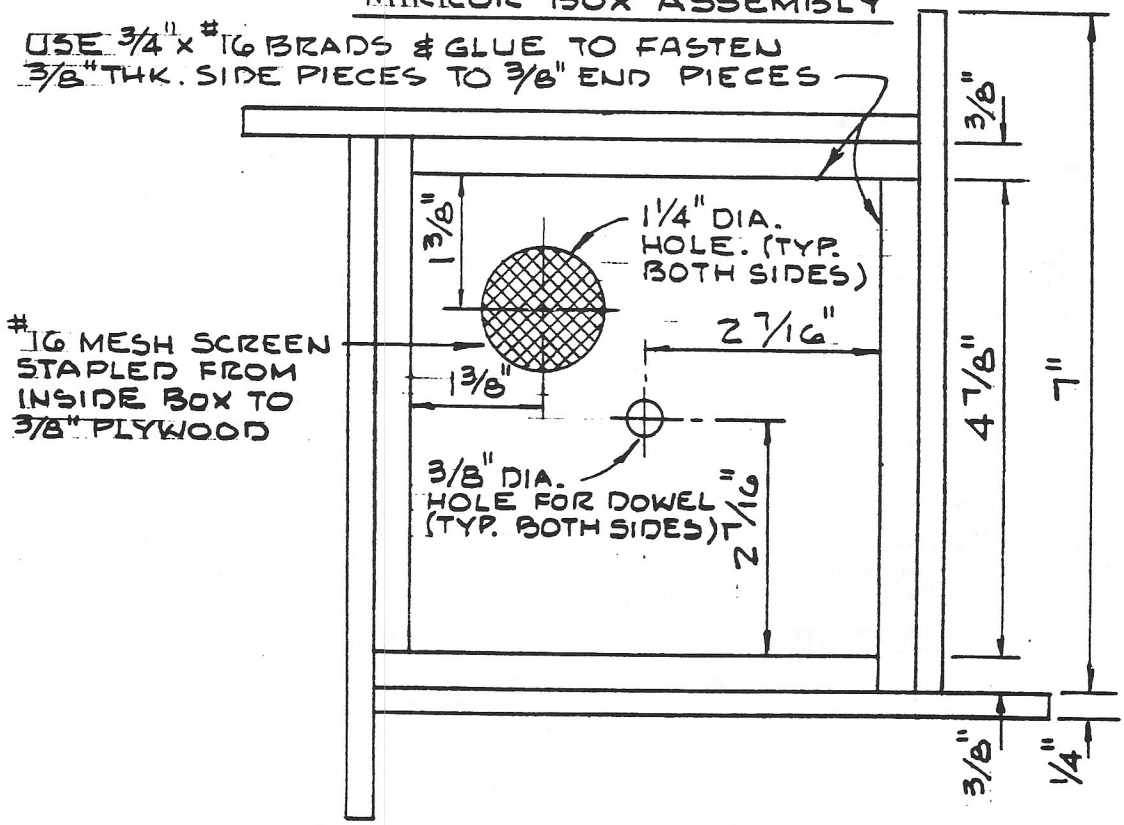
Assemble the box, stand, washers, and dowel as shown on page one. Screw a 1/2" x #4 sheet metal screw into each end of the dowel/axle to hold everything in place.



STAND ASSEMBLY



TOP VIEW OF
MIRROR BOX ASSEMBLY


USE 3/4" x #16 BRADS & GLUE TO FASTEN 3/8" THK. SIDE PIECES TO 3/8" END PIECES
#16 MESH SCREEN STAPLED FROM INSIDE BOX TO 3/8" PLYWOOD
1 3/8"
1 1/4" DIA. HOLE. (TYP. BOTH SIDES)
2 7/16"
1 3/8"
3/8" DIA. HOLE FOR DOWEL (TYP. BOTH SIDES)
2 1/16"
3/8"
4 7/8"
7"
3/8"
1/4"

SIDE VIEW OF
MIRROR BOX ASSEMBLY

FLOOR STILTS

Balance and coordination challenges are presented with these safe and simple floor stilts. In use, the child holds onto the upright poles and places one foot onto each foot rest. Then, by coordinating lifting and stepping, the child "walks on stilts." Lots of fun because it presents a new adventure.

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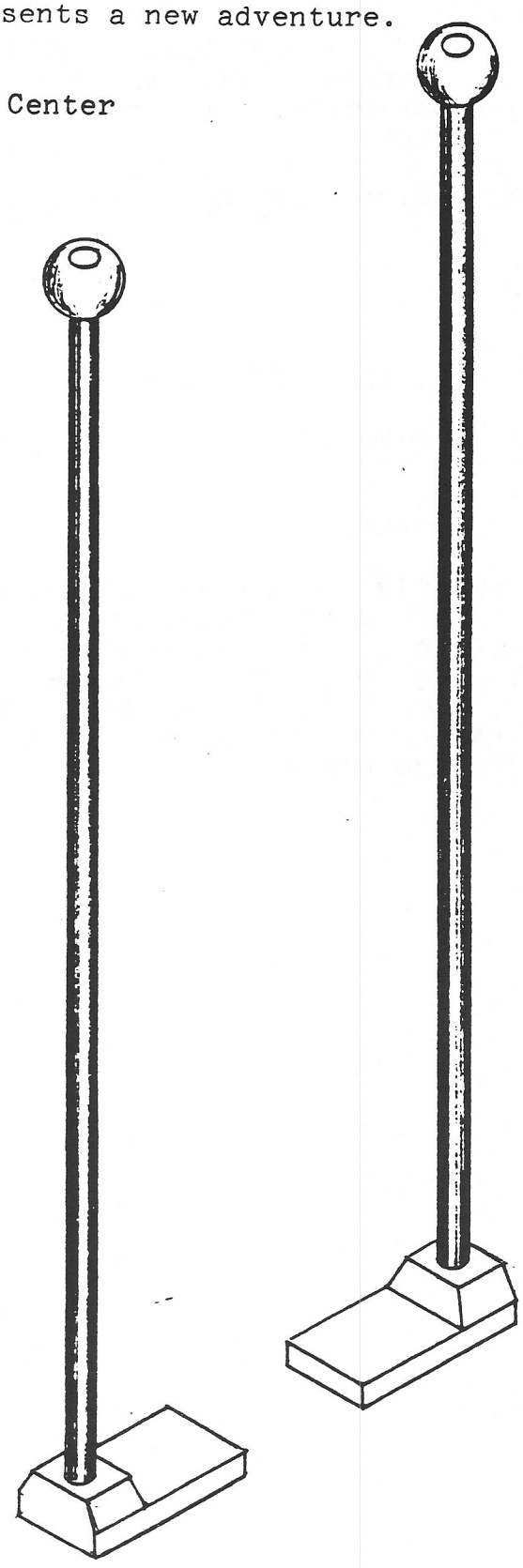


Materials needed:

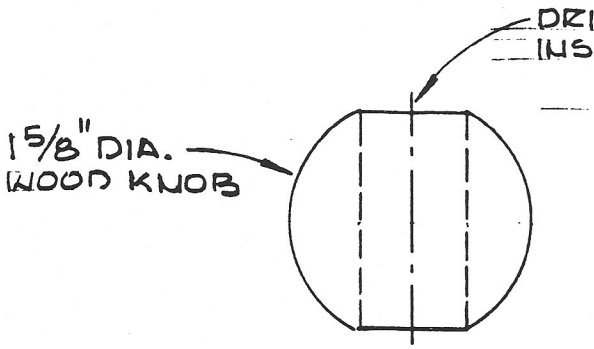
- Two pieces 28" long x 3/4" diameter dowels
- Two 1 5/8" diameter wooden balls or two pieces 1 3/4" long x 1 1/4" diameter dowel of stair rail
- Two pieces 4" x 2" x 3/8" birch plywood
- Two pieces 2" x 1 3/8" x 3/4" birch plywood or four pieces 2" x 1 3/8" x 3/8" birch plywood (and glue up)
- Elmer's Carpenter's Glue or equal
- Non-skid material for bottoms and tops of foot rests
- Contact cement
- Red Varathane enamel for ball
- Varathane gloss varnish or equal

Tools needed:

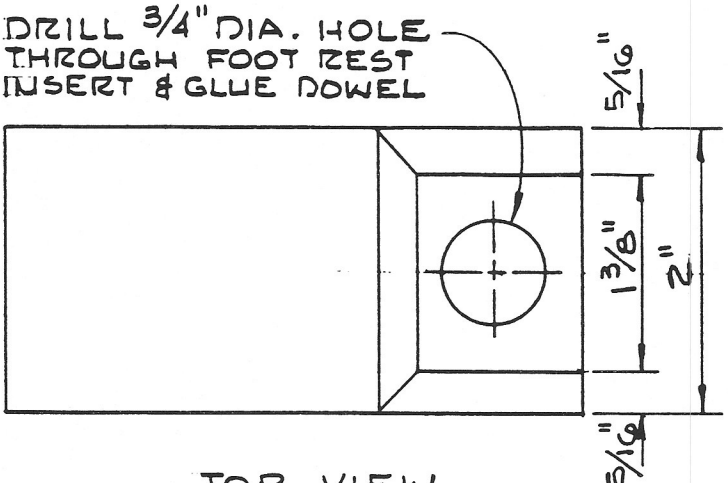
- Saw
- Power drill and 3/4" drill bit
- Brush
- Sander or sandpaper

Construction suggestions:

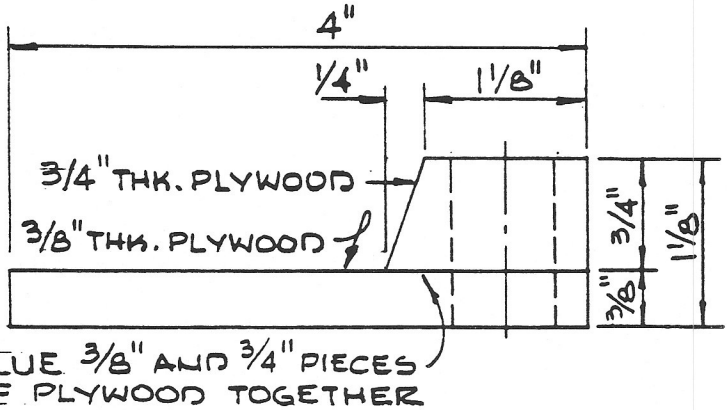
Follow details on the drawing on page 3 if you have been able to find 1 5/8" wooden balls in a crafts store. If no 1 5/8" balls are available, get a length of 1 1/4" diameter dowel, or "full round" stair rail, at a lumber yard and cut, drill and sand to oval two 1 3/4" lengths. Cementing some non-skid material on the bottoms and tops of the foot rests makes them more stable for the child.



HANDLE KNOB

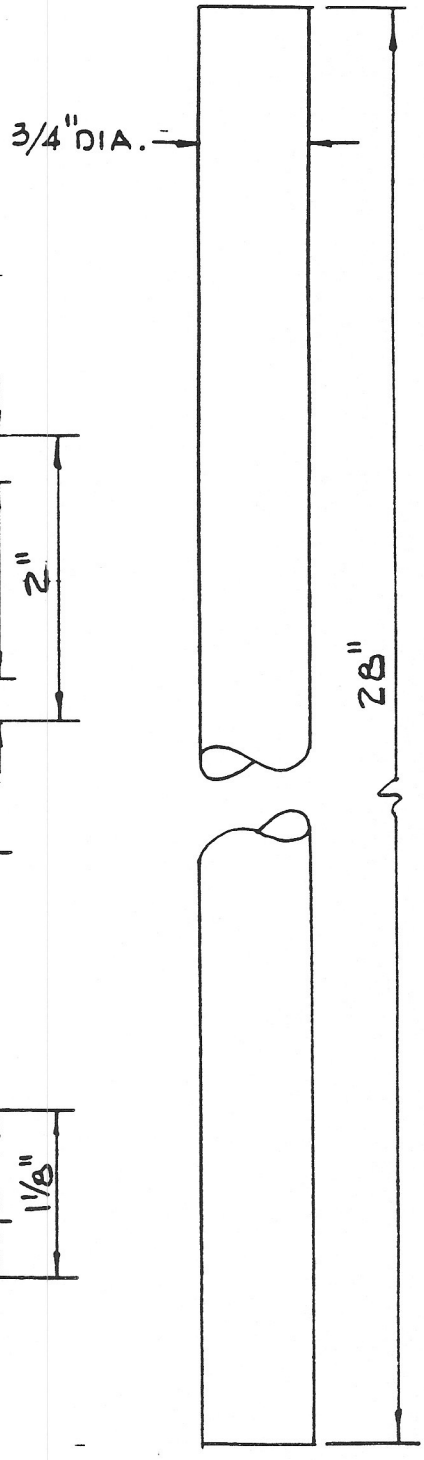


TOP VIEW
OF STILT FOOT REST



GLUE 3/8" AND 3/4" PIECES
OF PLYWOOD TOGETHER

FRONT VIEW
OF STILT FOOT REST



STILT STEM - 3/4" DIA. DOWEL

NOTE:
2 PIECES REQUIRED OF EACH
FOR A PAIR OF STILTS

DOOR BOX

This is a busy box style toy. Six small doors are locked, each with a different type of device. Inside each door is a surprise to see but not remove. The bright colors and shiny hardware also stimulate interest.

Materials needed:

- Two pieces 12" x 12" x 3/8" birch plywood
- Two pieces 1 1/4" x 9 3/4" x 5/8" birch plywood
- One piece of 1/4" x 12" x 12" birch plywood for back
- Brass-plated continuous hinge (piano hinge) 1 1/16" x 48" with screw
- 1" diameter wooden cupboard knob
- 2" dull brass-plated window bolt
- Dull brass-plated 4" long drawer handle
- Dull brass-plated cupboard turn
- Solid brass hasp with hook lock
- 1/2" diameter brass cabinet knob
- Dull brass plated sash lock
- Kitchen cabinet friction catch
- Kitchen cabinet magnetic catch
- Five rubber or plastic farm animals or other small, interesting objects to fit into the box
- Varathane enamel, or equal, in red and yellow
- Elmer's Carpenter's Glue
- Four pieces 3/8" #5 wood screws
- Non-skid material for bottom of box

Tools needed:

- Table saw
- Electric drill and set of drill bits
- Sander
- Hacksaw
- Vise
- Screwdrivers, ruler, brush, sandpaper, etc.

Construction suggestions:

The Door Box is a compact toy with many parts requiring many saw settings, etc. so it seems sensible to make several of these at one time. Even though the continuous hinge must be hacksawed into 6 pieces of 2 7/8" each, it was found to be the most durable of many tried. There was also a wide price range for some hardware items, especially the continuous hinge.

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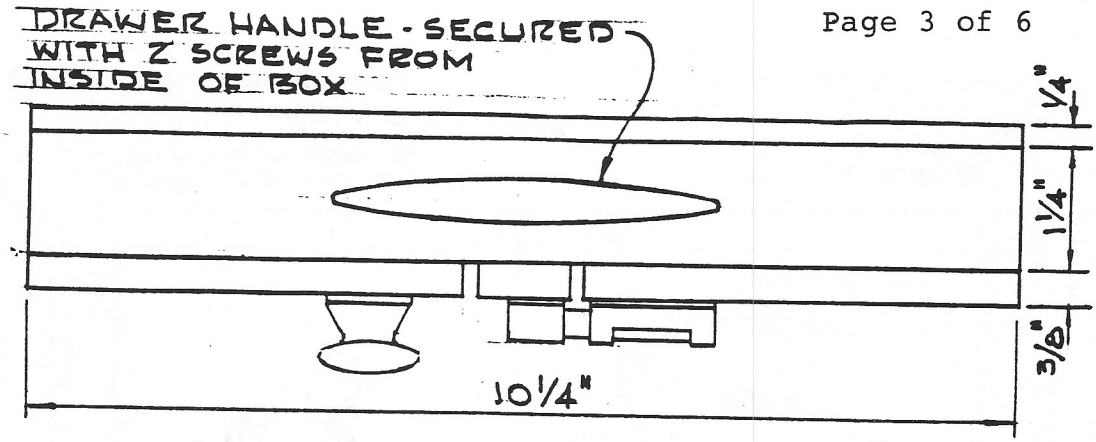
After cutting the 2 7/8" segments, cut off the seventh segment where the saw cut occurred. File all saw cuts smooth.

Follow the drawings on pages 4 and 5 to construct the box. The 1/8" deep slots may seem unduly complicated but there are only two slot patterns: one pattern for the two side boards and the two center boards and another pattern for the top and bottom side boards. When several door boxes are made at one time, the time used for slot sawing is made up many times by the reduced assembly time. The resulting doors will be interchangeable.

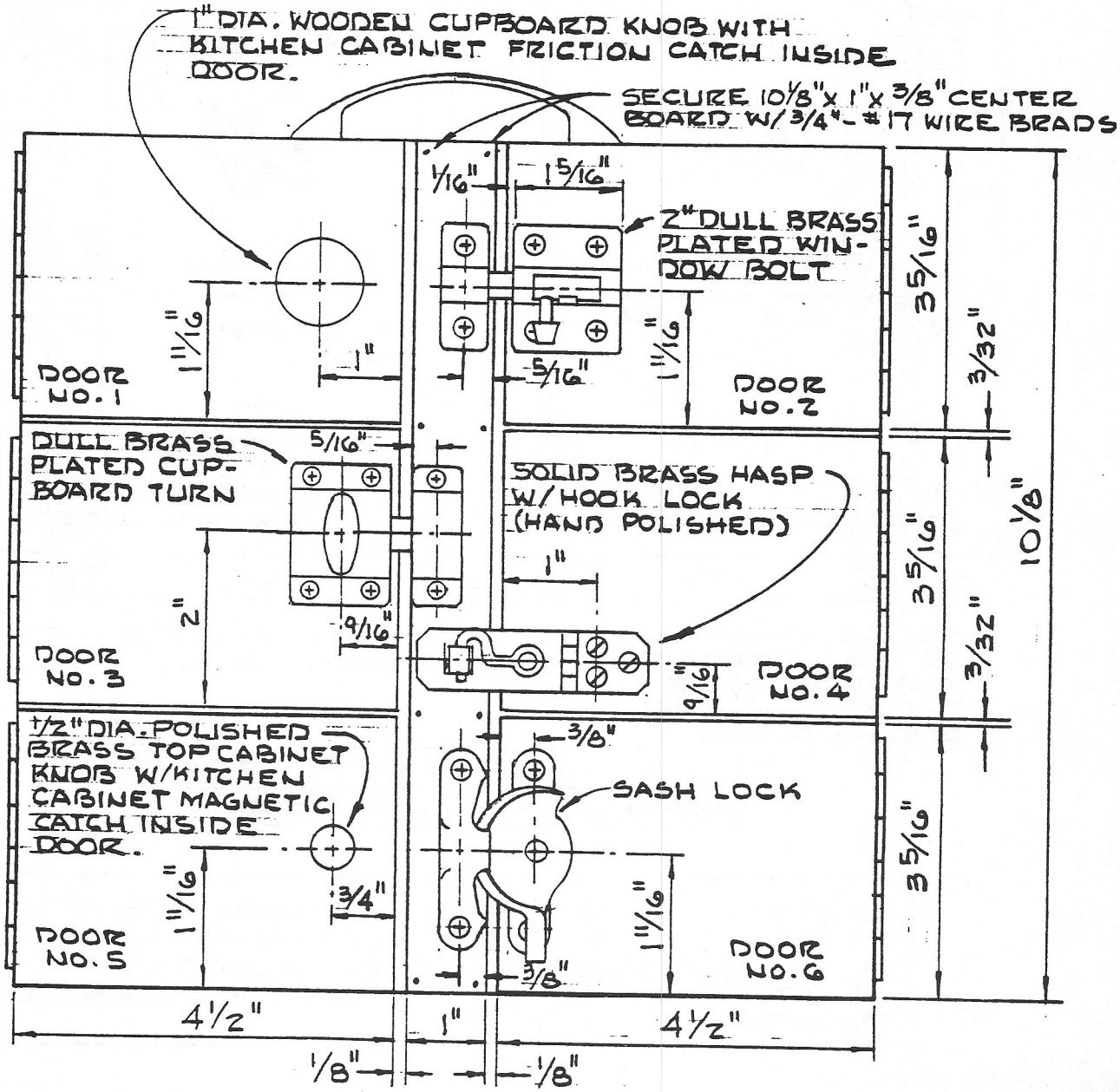
When the doors are cut, bevelled on the top edges, and sanded, they and the box, should be placed on a big piece of cardboard with the inside of the door up, and spray or hand painted with yellow enamel on the inside. Both the red and yellow enamel will need two coats. Then turn the box over and paint the outside and bottom with red enamel. Also turn the doors over and paint the tops and edges with red enamel.

Carefully attach the hinges to the doors and the doors to the box. With the doors in place, locate the inside friction catch and the magnetic catch. Remove the doors to screw the catches in place. Adjust these catches so that they open easily.

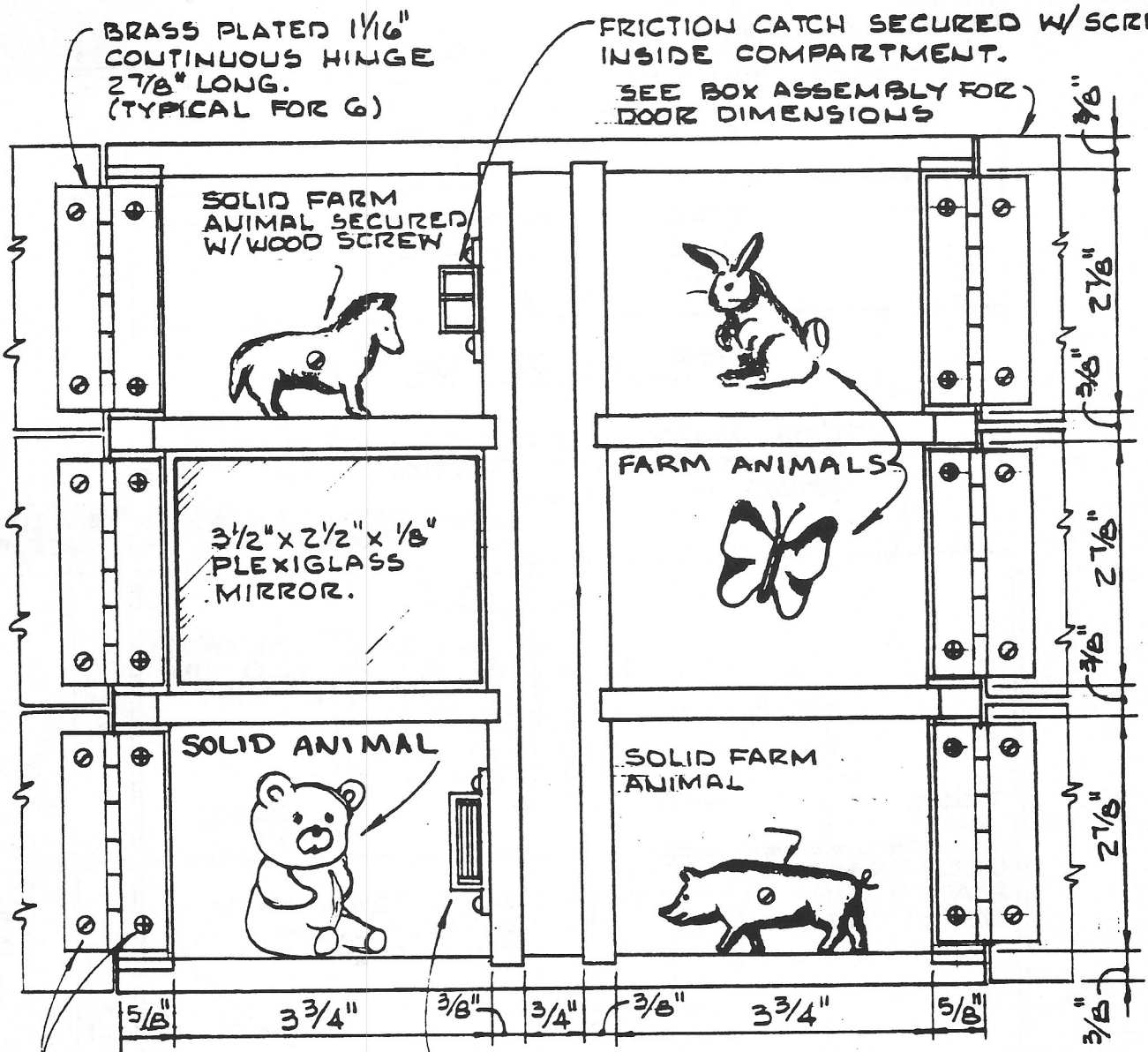
Sand a flat surface on one side of the rubber/plastic farm animals. Drive a sheet metal screw through the body and well into or through the back of the box. This animal is not supposed to be removed by the child. Also screw the mirror in place. Grind off the ends of the screws that may protrude through the back of the box or the fronts of the doors. Carefully, touch up the paint. Put non-skid material on the bottom of the box.



TOP VIEW OF DOOR BOX



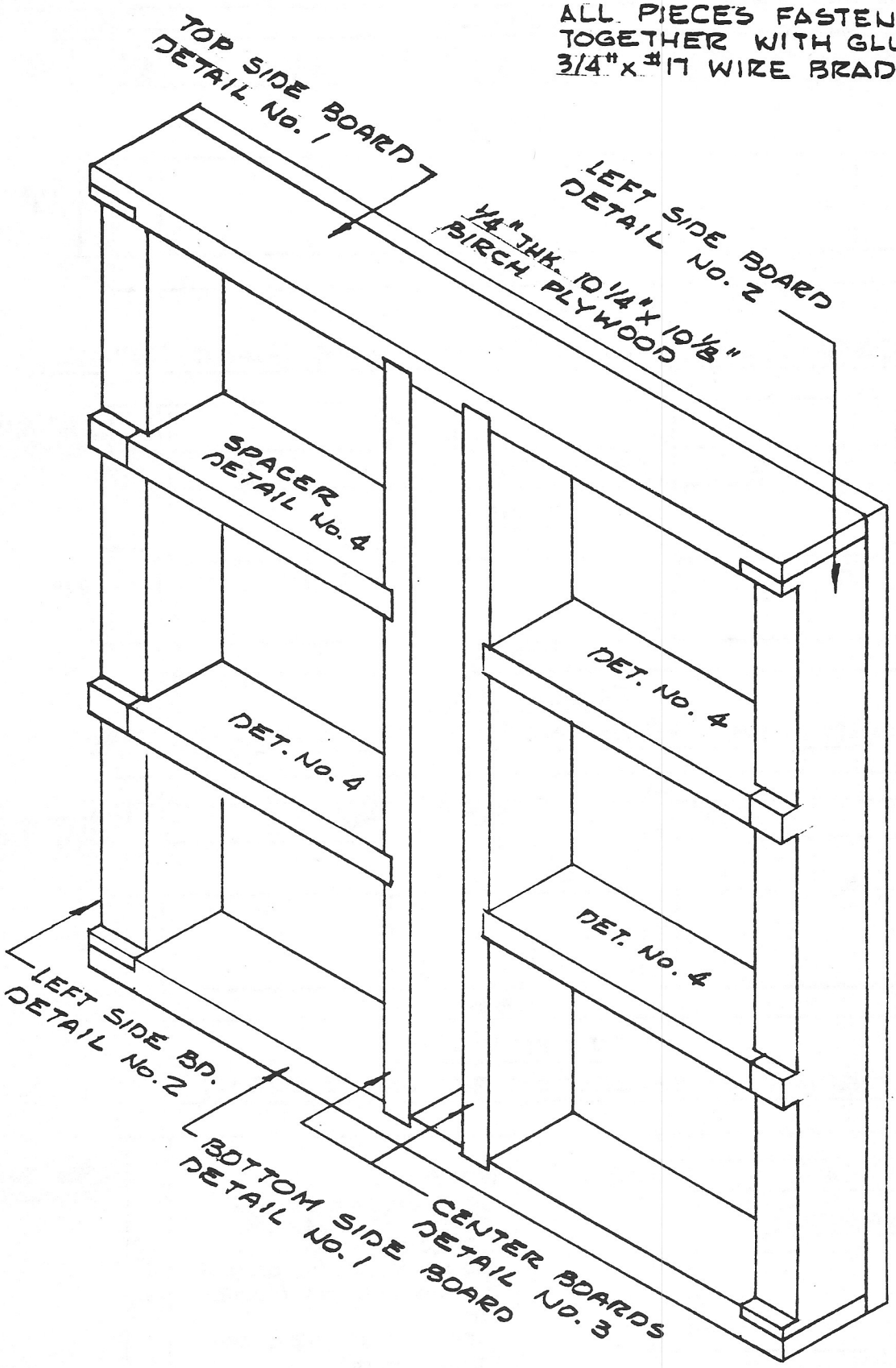
FRONT VIEW OF DOOR BOX


BRASS PLATED 1 1/16" CONTINUOUS HINGE 2 7/8" LONG. (TYPICAL FOR 6)
FRICTION CATCH SECURED W/ SCREWS INSIDE COMPARTMENT.
SEE BOX ASSEMBLY FOR DOOR DIMENSIONS
SOLID FARM ANIMAL SECURED W/ WOOD SCREW
3 1/2" x 2 1/2" x 1/8" PLEXIGLASS MIRROR.
FARM ANIMALS
SOLID ANIMAL
SOLID FARM ANIMAL
3/8"
2 7/8"
5/8"
3 3/4"
3/8"
3/4"
3/8"
3 3/4"
5/8"
SECURE HINGES WITH 1/2"- #5 SLOTTED WOOD SCREWS TO DOOR & PHILLIPS HEAD WOOD SCREWS TO BOX.
MAGNETIC CATCH. SECURED W/ 2 SCREWS INSIDE COMPARTMENT.

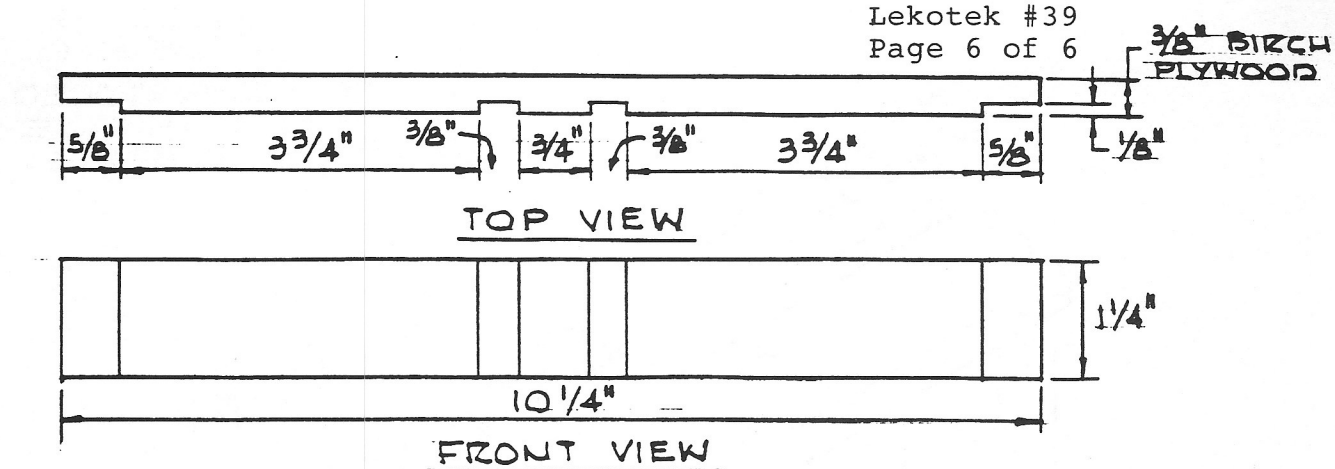
FRONT VIEW OF DOOR BOX
SHOWN WITH OPENED DOORS

CAUTION: ALL DIMENSIONS SHOWN ARE BASED ON THE PLYWOOD BEING 3/8" AND 5/8" THICK. ALL DIMENSIONS SHOULD BE ADJUSTED ACCORDINGLY TO FIT ACTUAL THICKNESS OF PLYWOOD.

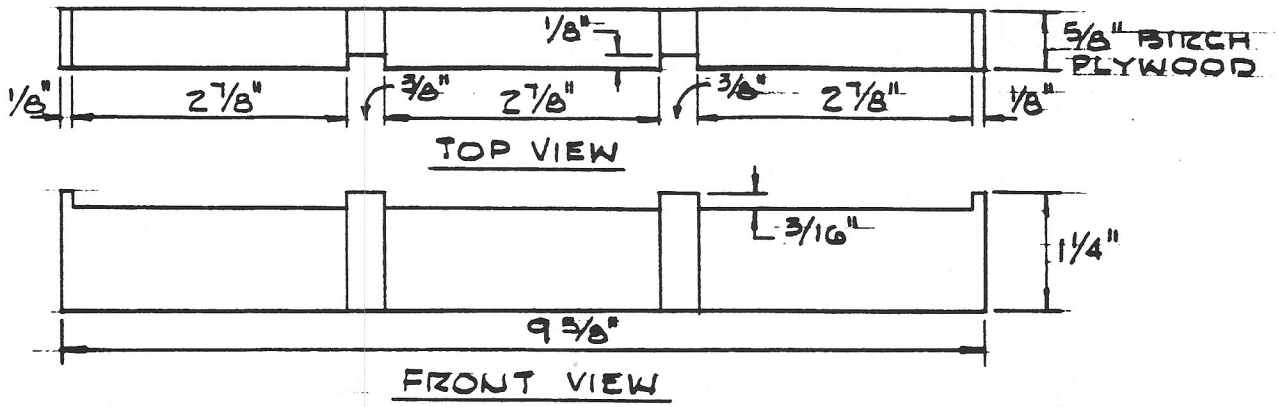
ALL PIECES FASTENED TOGETHER WITH GLUE AND 3/4" x #17 WIRE BRADS.


TOP SIDE BOARD DETAIL No. 1
LEFT SIDE BOARD DETAIL No. 2
1/4" THK. 10 1/4" X 10 1/2" BIRCH PLYWOOD
SPACER DETAIL No. 4
DET. No. 4
DET. No. 4
DET. No. 4
LEFT SIDE BD. DETAIL No. 2
BOTTOM SIDE BOARD DETAIL No. 1
CENTER BOARDS DETAIL No. 3

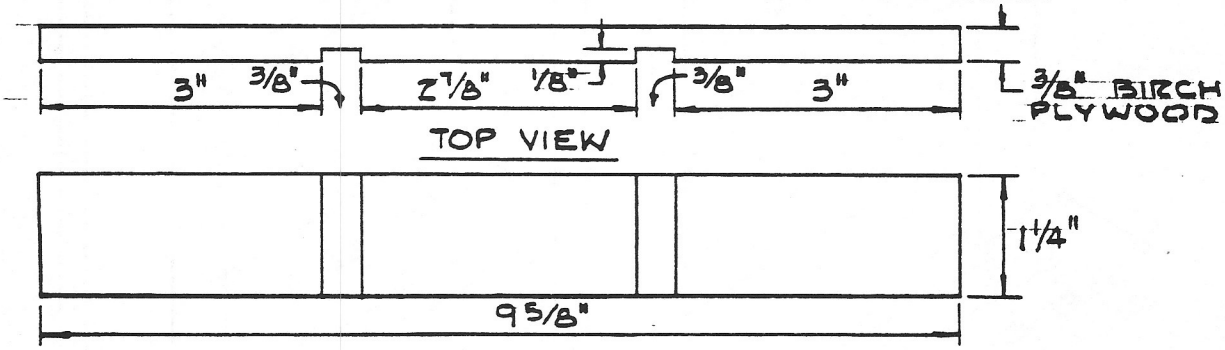
VIEW SHOWING CONSTRUCTION OF DOOR BOX



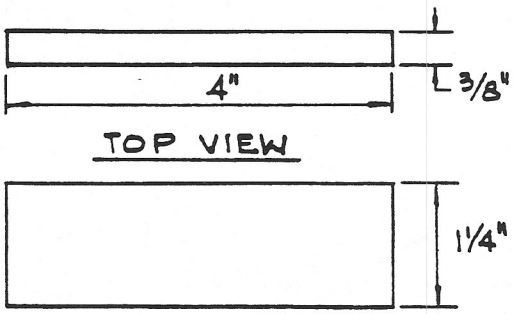
DETAIL No. 1 - TOP & BOTTOM SIDE BOARD DETAIL



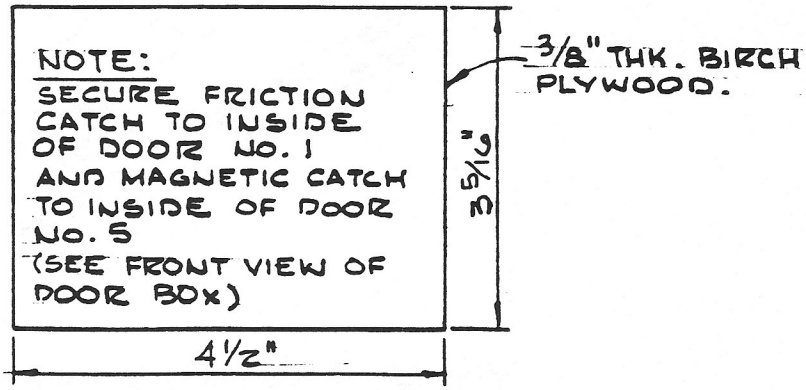
DETAIL No. 2 - RIGHT & LEFT SIDE BOARD DETAIL



DETAIL No. 3 - CENTER BOARD (2 REQ'D)



DETAIL No. 4
COMPARTMENT SPACER
(4 REQ'D)


NOTE:
SECURE FRICTION CATCH TO INSIDE OF DOOR NO. 1 AND MAGNETIC CATCH TO INSIDE OF DOOR NO. 5
(SEE FRONT VIEW OF DOOR BOX)
3/8" THK. BIRCH PLYWOOD.
5 5/16"
4 1/2"

DOOR DETAIL
(6 REQ'D)